JULY 3, 1995 VOLUME 12, NUMBER 27

NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

ONE YEAR LATER

Bay Networks Chairman Severino follows up on product integration promises. Page 10.

Oracle adding workflow and 'Net access to applications

By Barb Cole
Redwood Shores, Calif.

Oracle Corp. this month will announce a revamped line of client/server applications that support workflow management, Internet access and application partitioning.

The company's next-generation Cooperative Applications suite, code-named the Smart-Client release, is expected to be rolled out within the next 12 months and outlined at a San Francisco press conference on July 18.

Oracle's existing collection of 30 accounting, human resources and manufacturing modules will gain Internet hooks, and users will be able to partition the modules and run the code across multiple client and server machines.

Eight new modules will round out the application suite and support what sources call the "value-chain business model," which tracks business processes deemed to add value to the goods and services com-

See **Oracle**, *page 44*

Oracle's client/server applications business accounted for $364 million of the company's $3 billion in fiscal 1995 revenue.

Steelmaker shows mettle in downsizing EDI system

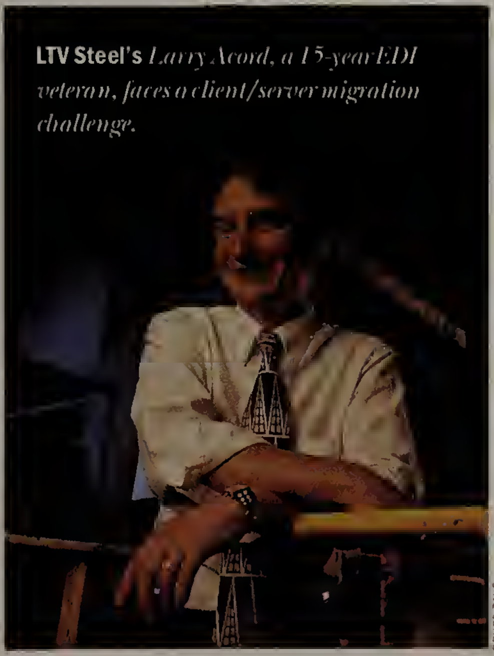
By Ellen Messmer
Cleveland

Talk about nerves of, well, steel.

LTV Steel Co. soon will begin phasing out its two-decade-old host financial systems in favor of Unix-based client/server applications. But potholes on the road to client/server could disrupt the more than 250,000 monthly electronic data interchange transactions that travel between LTV Steel and 530 of its trading partners, including automobile manufacturers, freight carriers and steel processors.

EDI pioneers, such as LTV Steel, all started on the mainframe. But only a handful of companies have braved the pain of moving to client/server EDI to reap the promised rewards of simpler financial management and

See **EDI**, *page 10*



LTV Steel's *Larry Acord, a 15-year EDI veteran, faces a client/server migration challenge.*

BRUCE ZAKE

IBM rallies mgmt. rivals

Big Blue seeks to mobilize industry around new network, systems management standards.

By Jim Duffy

COMPONENTS OF IBM'S MANAGEMENT INTEROPERABILITY INITIATIVE

- Agent instrumentation, including support for the Desktop Management Interface
- Platform interoperability for event and topology data sharing
- Application portability across management platforms
- Data modeling to ease creation of MIBs and management objects

IBM is spearheading yet another multivendor initiative to establish specifications for interoperable network and systems management products.

The company is rustling up support among platform and application vendors for a set of distributed management services that would be incorporated across product lines.

The services address four key issues: development of standard management agents, interoperability of management platforms, portability of applications across platforms and common modeling of management data.

Some vendors say the initiative is IBM's response to rumors of an impending acquisition of Network Managers, Inc. by Microsoft Corp. Network Managers supplies the code used in IBM's NetView for Windows, and the addition of Network Managers' technology to Microsoft's Systems Management Server could make Microsoft a formidable management rival. But the multivendor effort could blunt the impact of a Microsoft deal.

IBM and the other vendors will submit different specifications to the Internet Engineering Task Force, X/Open Company, Ltd. and the Network Management Forum for standardization, said Ray Williams, IBM senior technical staff member for network management systems. IBM will announce the initiative within five weeks, he said.

Sound familiar? IBM is essentially picking up where the Open Software Foundation, Inc. (OSF) and the Management Integration Consortium (MIC) left off in creating management interoperability standards.

The OSF's Distributed Man-

See **IBM**, *page 46*

New technology will rightsize ATM WAN links

By Michael Csenger

A new technology is emerging that would let users easily set up wide-area ATM links that fit just right.

ATM Inverse Multiplexing (AIM), a technology specification being drafted by the ATM Forum, will let users bundle multiple Asynchronous Transfer Mode lines into a single higher speed pipe that fills the gap between current T-1-based ATM

See **ATM**, *page 44*

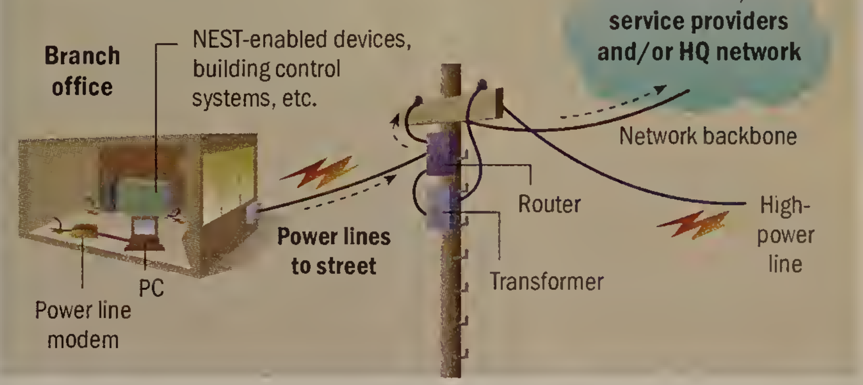
Quit worrying

Network World TEST ALLIANCE

We found four products that promote high availability for mission-critical servers. Page 31.

POWER LINE NETWORKING

Novell's Powerline Technology would connect PCs and smart devices over power lines, giving homes and remote offices access to corporate nets and other resources.



ZAP! NetWare users get really wired – over electric power lines

By Kevin Fogarty
Provo, Utah

Now this is plug and play.

Novell, Inc. is working on a way to let NetWare users tie remote offices and workers' homes into corporate networks using electric power lines instead of phone lines or cabling.

The technology would not only support information sharing, but would also give network vendors, appliance companies, security firms and others a way to remotely monitor and manage smart devices in branch offices or virtually any other location served by an electric utility.

Novell's Powerline Technology is a set of protocols and interfaces that would let devices — from alarm systems to coffee makers — running its NetWare Embedded Systems Technology (NEST) talk across power lines.

NEST is a "lite" version of Novell's NetWare operating system designed to link smart devices across any type of net.

The Powerline Technology would also be useful in linking

See **Novell**, *page 44*

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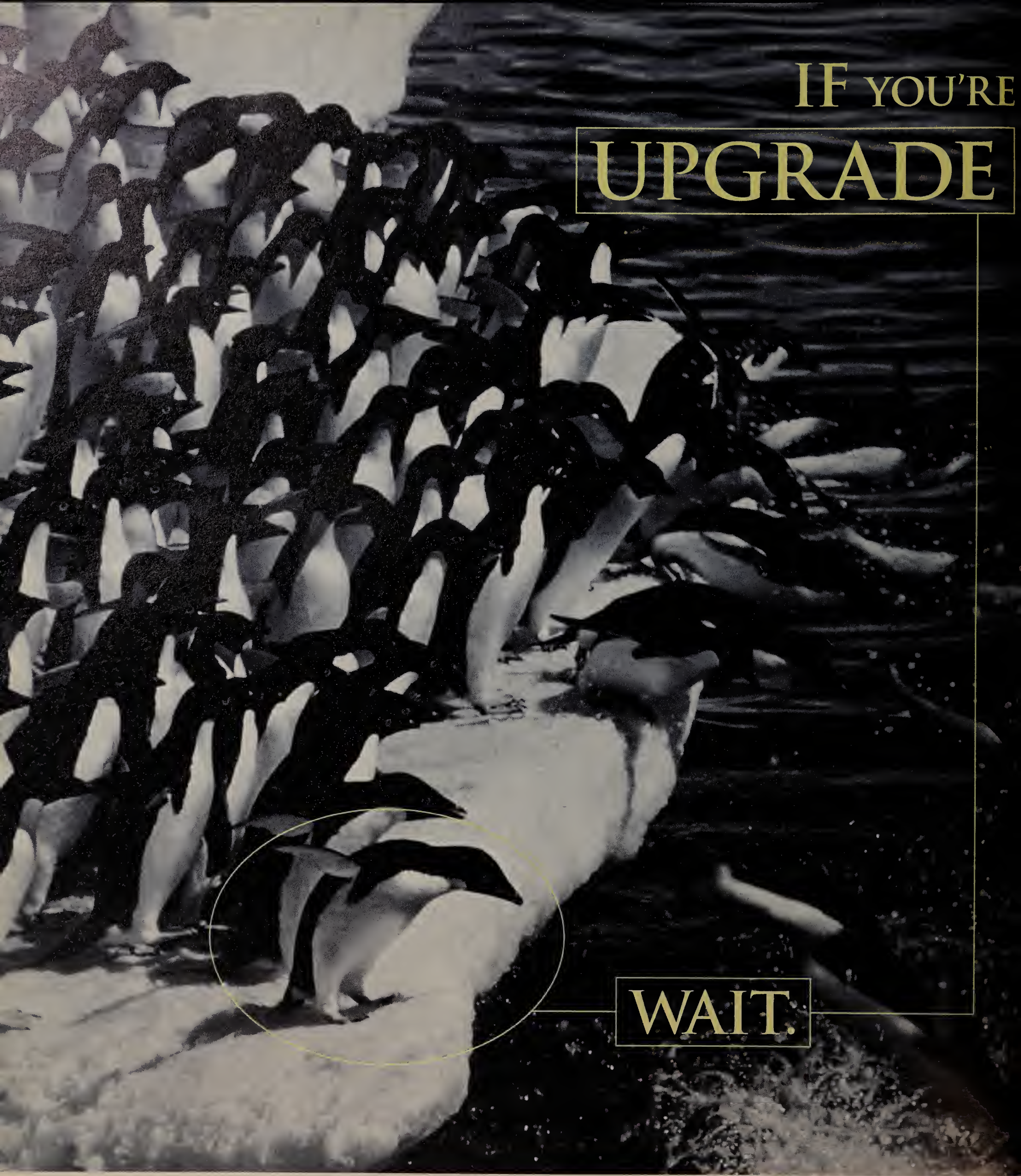

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PLANNING TO YOUR NETWORK,

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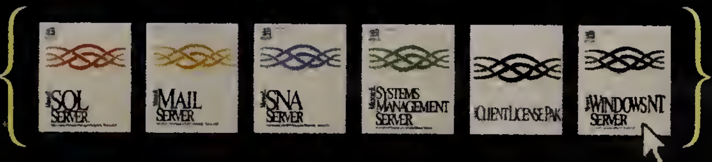

With its advanced microkernel architecture, protocol independence, and consistent support for applications, Windows NT Server is the platform for networking and client-server applications. A combination that can serve your business well into the next century. ● So if you're planning to upgrade your network, make sure you have the facts. (There are more than a few listed on your right.) Then contact your nearest reseller, or any of those listed below, for a 10-user Network Value Pak. Yours for only $999 ($839 for you NetWare upgraders). Need more details? Call (800) 434-3982, Dept. HUA.

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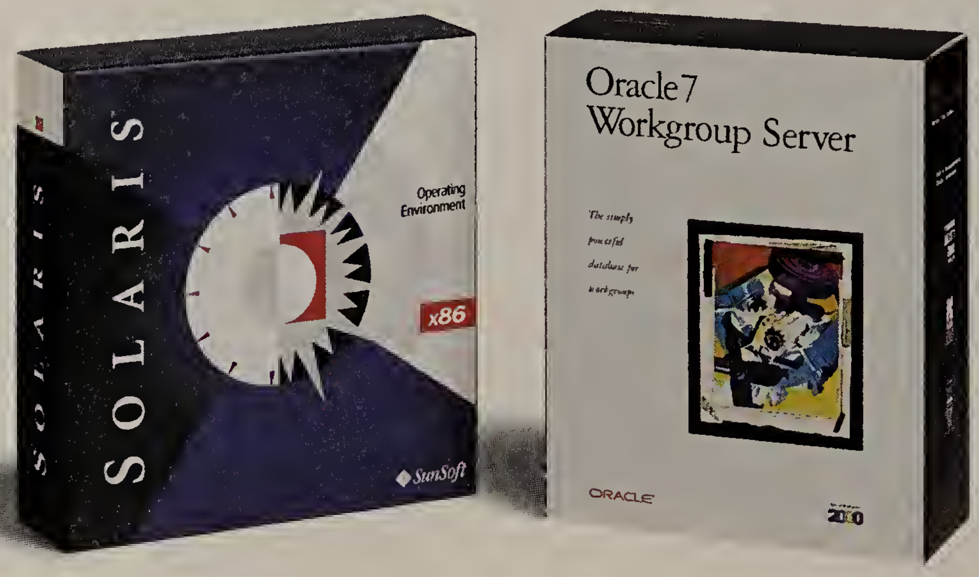

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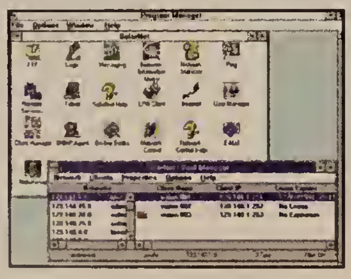

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ORAC1

Briefs July 3, 1995

Keeping an eye on ATM

■ Hoping to lay the foundation for an ATM Remote Monitoring standard, Fore Systems, Inc. this week will announce the formation of the ATM Monitoring group. Fore is leading the 15-member consortium in developing an ATM Circuit Steering Management Information Base that will let test and monitoring equipment analyze the content of ATM virtual circuits (*NW*, June 12, page 6).

Modem merger

■ Bankrupt modem pioneer Hayes Microcomputer Products, Inc. is being bought out by fellow modem maker Boca Research, Inc. in a $29.7 million stock deal announced last week. Hayes filed for bankruptcy last November as a result of cash flow problems that stemmed from shrinking margins and production backlogs, analysts said.

Dennis Hayes, chairman and president of Hayes, will become vice chairman of the combined company, which will keep the Hayes name.

Cleaning up the 'Net, Part I

Miller

■ Harris Miller, president of Arlington, Va.-based trade group Information Technology Association of America (ITAA), which represents 6,700 software and service providers, last week announced the formation of a task force to define a "reasonable middle ground" in the Internet pornography and censorship debate triggered by Sen. James Exon's (D-Neb.) Communications Decency Act. The ITAA hopes to have a proposal — possibly advocating a technical plan for blocking access or ratings — to present to Congress, the industry and the public by this fall.

Cleaning up the 'Net, Part II

■ Reps. Christopher Cox (R-Calif.) and Ron Wyden (D-Ore.) last week introduced the Internet Freedom and Family Empowerment Act, a bill to ensure that on-line service providers attempting to use content-filtering technologies to keep obscenities off their networks won't be held liable as publishers, a consequence of current law. The bill also bars the Federal Communications Commission from content regulation of the Internet and encourages industry cooperation in furthering ways to improve user control over information received by children. The bill will be presented in the House as an alternative to Exon's Communications Decency Act.

MCI joins 'Net team

■ MCI Communications Corp. has joined the Internet initiative begun by ANS CORE Systems, Inc. and Sprint Corp. to exchange carrier traffic congestion and other management information for ensuring high-performance public IP networking. The companies will carry out troubleshooting procedures based on signed bilateral agreements.

Telecommuters in touch

■ AT&T last week introduced a family of services designed to automatically route calls to and from telecommuters. Under AT&T's Alternative WorkPlace Solutions, inbound 800 calls to a company site can be routed to various telecommuting employees. And features under AT&T's Software-Defined Network can be extended to both fixed telecommuters and mobile employees.

NetworkWorld
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LANNET's Avi Fogel *says that Madge realized it couldn't stick with strictly token ring because customers want to use a mix of net technologies. Page 19.*

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NetworkWorld's *Mission: To provide news and analysis that help network IS professionals deliver the network computing infrastructure and distributed applications required to meet evolving business needs.*

IBM ready to roll out SNA migration linchpin

By Michael Cooney
Raleigh, N.C.

IBM next week will plant a big obstacle in the path of router vendors trying to get into the data center.

The company plans to introduce the Nways 3746 Model 950 — the next generation of IBM's venerable 3745 front-end processor (FEP) family and the embodiment of IBM's multiprotocol convergence strategy. That strategy defines how Big Blue will help Systems Network Architecture users "morph" their networks into multiprotocol backbones without trashing existing equipment.

The 3746 and other products, such as IBM's recently introduced 2217 Nways Multiprotocol Concentrator (*NW,* March 27, page 28), are also designed to block inroads into the SNA world by router vendors, which are crafting their own SNA/LAN coexistence strategies.

Cisco Systems, Inc. has been particularly aggressive, having uncorked a raft of SNA connectivity wares in the past year — led by the introduction of its mainframe channel-attached router and its subsequent support for IBM's Advanced Peer-to-Peer Networking.

The 3746-950 is the funnel through which IBM hopes users will channel SNA, APPN and LAN traffic to the mainframe.

Router vendors, such as Cisco, argue that the router is best suited for this multiprotocol linchpin role, not the aging FEP.

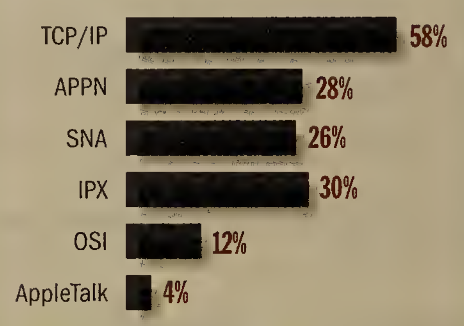
"Users are looking to move their mainframe communications environments to modern networking equipment capable of handling multiprotocol traffic," according to Scott Palmquist, product manager of Cisco's mainframe internetworking products.

The battle lines were clearly drawn last fall when IBM vowed to defend its host-networking turf and backed up the claim by promising to offer frame relay, TCP/IP routing, APPN and High-Performance Routing (HPR) support across its line of communications processors by

See **IBM,** *page 45*

TRUE BLUE?

By 1996, IBM networks will support a plethora of protocols.



Percentage of nets supporting each protocol. Based on a survey of 200 users.

GRAPHIC BY TERRI MITCHELL SOURCE: IDC, FRAMINGHAM, MASS.

Cisco internetworking, Compaq server technologies to meet

By Margaret Dornbusch and Jim Duffy
Houston

Compaq Computer Corp. and Cisco Systems, Inc. last week vowed to marry their server and internetworking technologies to make it easier for customers to bring remote sites into corporate client/server environments, among other things.

The announcement offered a sketchy look into plans to combine internetwork market leader Cisco's Internetwork Operating System (IOS) software routing technology with server market king Compaq's hardware and management software.

For Compaq, the deal marks a big step forward in a strategy of beefing up its presence in the enterprise network arena (*NW,* Jan. 30, page 1). For Cisco, the deal continues the expansion of its IOS technology into new realms. Cisco has made no bones about wanting to become the Microsoft of the internetworking industry and has lined up numerous networking vendors to sell IOS. The deal also opens up Compaq's powerful reseller channel to Cisco.

"This is the first time we've taken IOS and married it with the standard [Intel] platform, with all of the possibilities that entails," said Christine Hemrick, director of product marketing for Cisco's IOS. 'You have a large number of manufacturers creating interface cards and bus technologies. That creates numerous possibilities for combining technologies."

While the agreement is thin on product specifics, it calls for the companies to develop joint marketing, cooperative service and support programs, and to build network management tools incorporating Compaq technology and the CiscoWorks applications.

Eventual products could range from routers on network adapters to route servers for virtual nets. Compaq could even

See **Compaq,** *page 46*

NorTel wireless phone system links campus users

By David Rohde
Richardson, Texas

Northern Telecom, Inc. last week introduced a wireless adjunct to private branch exchange systems designed to provide callers with instant access to all employees within a building or campus, even those away from their desks.

The Companion Wireless Communications System consists of centralized controller units, radio base stations and portable telephones that provide up to 4 million square feet of coverage.

The Companion system is said to be the first to use the 1910-MHz to 1930-MHz portion of the radio spectrum, which was allocated last year by the Federal Communications Commission for unlicensed personal communications services (PCS). The system fills a gap between cordless systems with tight distance limitations and cellular phones that rack up airtime charges.

"It's designed really to fit between the two wireless technologies that we're most well aware of now," said Dave Murashige, director of product development for NorTel's Enterprise Mobility division.

The Companion system is also designed to alleviate frustration with voice mail by ensuring that callers get through to employees more often and routed to voice mail less frequently. Research commissioned by NorTel and released just prior to the

See **NorTel,** *page 46*

Antitrust action

Network managers shrug at Microsoft's latest legal fight

By Peggy Watt
Redmond, Wash.

The Department of Justice has focused its antitrust microscope on Microsoft Corp. yet again, but network managers say Microsoft's ongoing legal problems will have little effect on how they work with the company.

Some customers applauded Microsoft's reaction to the government's latest moves — the company filed suit claiming a "campaign of harassment" by the Justice Department, which is now investigating The Microsoft Network (MSN) on-line service scheduled to debut next month. But most users don't quite buy the company's portrayal of itself as a victim.

The charges

"So Microsoft's getting its fingers stomped a little bit. Anytime you get big, you draw more attention," said Jerry Zickrick, manager of information services with ProBusiness, Inc., a Pleasanton, Calif., service bureau.

Microsoft's countersuit requests the Justice Department drop a June 21 Civil Investigative Demand investigating MSN. The Justice Department seeks extensive documentation, including business plans, budgets, user license projections, names of current and prospective partners, in addition to other materials, to be delivered within 48 hours, a demand Microsoft's affidavit deems "obviously unreasonable."

"It was a defensive measure," a Microsoft representative said. "We couldn't comply with such an exhaustive request in just two days."

The federal District Court set a July 24 hearing on whether Microsoft must produce all of the documents. This probe is the latest in a string of federal investigations of Microsoft (see graphic, page 8) and was encouraged by current on-line service providers that will compete with MSN. Microsoft plans to bundle MSN access with Windows 95, which CompuServe, Inc., America Online, Inc. and Prodigy Services Co. consider an unfair marketing advantage.

Customers must log on and subscribe to MSN to use it, Microsoft representatives pointed out. The representatives said the suit will not delay Windows 95, which is scheduled for release next month, and that they still plan on bundling MSN access.

Although they have followed news reports on five years of federal antitrust investigations of Microsoft, corporate customers said they do not let speculation affect their buying plans. Most users are unconcerned whether the latest actions strip MSN from Windows 95, although they hope Microsoft will not delay Windows 95's release.

"I don't have a single customer that cares one way or another about the investigation for its buying decisions," said Robert Ginsberg, senior field engineer with The Computer Group, an Augusta, Ga., consulting firm that provides outsourcing support for Microsoft networking products.

The investigation has not deterred prospective MSN content providers, either. Simon & Schuster, Inc., which standardized on Microsoft products, is considering participating in MSN.

"I'm confident Microsoft will

See **Microsoft,** *page 8*

HP delivers dual-speed LAN switch

By Jodi Cohen
Palo Alto, Calif.

Hewlett-Packard Co. last week unveiled a departmental LAN switch designed to work with the company's stackable hubs.

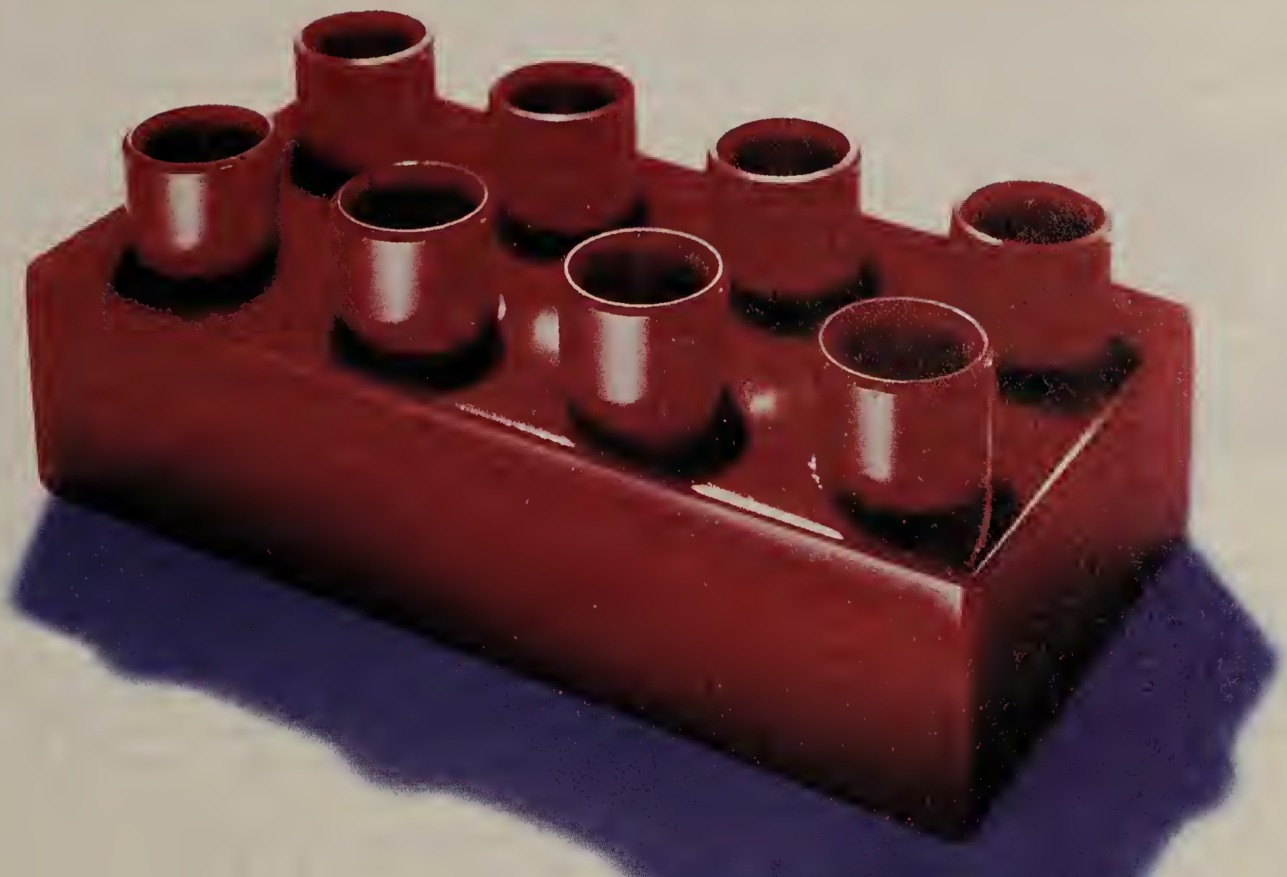
HP's AdvanceStack 10/100 LAN Switch, as expected, provides dedicated bandwidth to multiple users on a LAN segment, connects 10Base-T and 100VG-AnyLAN workgroups, and offers a dedicated high-speed pipe to a file server (*NW,* May 1, page 1).

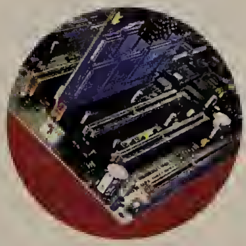
The 16-port Ethernet switch is based on a Kalpana, Inc. (now Cisco Systems, Inc.) device, which HP will enhance with two high-speed add-in modules. Previously, HP offered only a six-port Ethernet switch, also made by Kalpana, that does not have high-speed uplinks.

Rick Bauer, director of instructional technology at the Severn School in Annapolis, Md., will use HP's switch to relieve net

See **HP,** *page 45*

"Building on to my system
shouldn't require a degree in rocket science."





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IBM bringing virtual reality to electronic tête-à-têtes

By Joanie Wexler

New Orleans

Will life-size, interactive videoconferences in which participants can barely distinguish a colleague that has been beamed in from one in the flesh change the way companies do business?

The IBM Global Network (IGN) thinks so. The company last week announced a connectivity and marketing partnership with hospitality company TelePort Corp. to provide virtual reality conferencing services.

Beginning in the fourth quarter, the companies plan to deploy during the next two years about 120 TeleSuites for hosting virtual reality conferences in 40 U.S. cities. Within five years, they plan to increase the number of TeleSuites, linked by IBM's value-added network, to 600 nationwide.

Is it live *or is it TeleSuite?*

For $49 to $169 per hour per site, users will be able to engage in lifelike meetings, say, during lunch. As many as four virtual participants can break bread at a table with four others by holding their meeting in a TeleSuite at a high-end hotel (see photo) or on their own premises.

TeleSuites will rely on TelePort's "video mirror" technology for replicating the surroundings at both sides of the conference, and Compression Labs, Inc.'s high-resolution, proprietary CTX Plus video compression systems for the realistic look. The suites eventually will appear on customer premises and at airports, restaurants and shopping malls.

A TeleSuite will cost $105,000 to $180,000 to build on the user's premises, according to TelePort.

The setup contrasts with today's room-and desktop-based conferencing, whereby virtual meetings take place on television-size monitors and, usually, one person is on camera at once.

The TeleSuite technology allows for systems based on industry-standard H.320 compression algorithms to participate in the conferences, but those participants default to the traditional monitor, explained David Allen, TelePort's chief executive officer.

IGN and Englewood, Ohio-based TelePort are hoping that lifelike interactions at an affordable price will propel businesses out of the mold of using videoconferencing for formal, static meetings and allow them to extend the technology to new uses, such as calling on customers and clients.

"This is an outstanding application for interviewing potential employees and students," said Stuart Mann, director of the School of Hotel, Restaurant and Recreation Management at Penn State University in State College.

Mann, who viewed the TeleSuite demonstration at the Hospitality Industry Technology Exposition and Conference here last week, said both audio and video quality "were very realistic. You got a sense of someone being right there with you."

"As far out as this may seem from a business sense, it isn't," said Sarah Dickinson, senior analyst at Personal Technology Research, Inc., a consulting firm in Waltham, Mass. "They're starting to attribute human behavior patterns to technology," she said.

Dickinson and Mann said the $69 to $149 pricing is attractive.

Comparatively, the Sprint Corp. Meeting Channel, a public room service that uses monitors, costs about $100 to $300 per site per hour for room rental, plus $90 to $180 per hourly meeting in transmission fees, according to Sprint. However, the videoconferencing services, offered in 140 of partner Kinko's, Inc. copy centers, totals just $150 per site.

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Microsoft

Continued from page 6

find a way to launch the on-line service despite the [Justice Department]," said Ivan Brass, Simon & Schuster vice president of information systems and technology (see story, page 25).

Government agencies and contractors are in the potentially awkward position of being affiliated with the target of Microsoft's suit, so they keep close tabs on the antitrust investigation.

"We need to be aware of the status of the investigations because we do most of our work with the Department of Defense," said Andy Reho, associate department head for distributed systems technology at Mitre Corp. in McLean, Va.

"It's more ammunition for people who are already predisposed to not choose Microsoft products," he added.

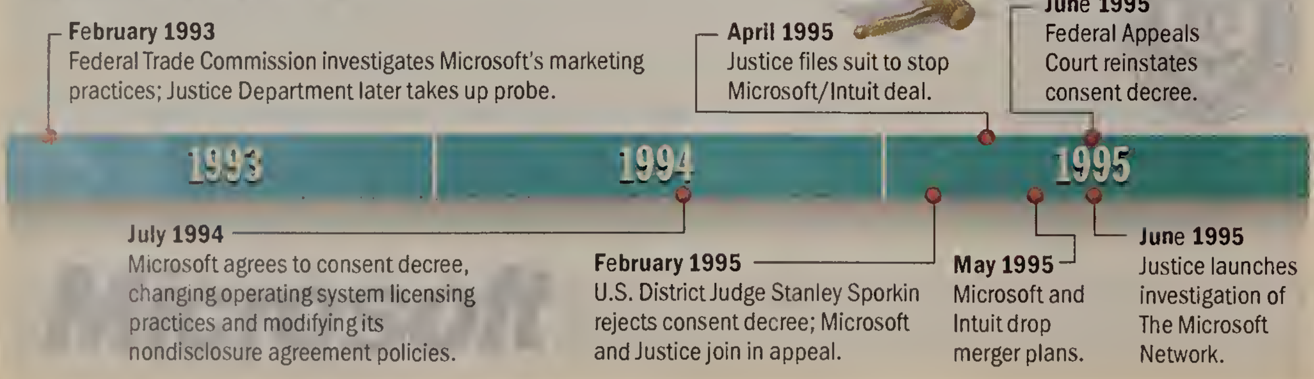
Some customers hope the Justice Department's scrutiny will prompt Microsoft to be more customer-oriented, even in markets it dominates.

"Microsoft deserves what they're getting from the Justice Department, but it's also good that they're kicking back," said Forrest Whitcher, a senior engineer with Boston Scientific Corp. in Watertown, Mass.

Boston Scientific chose OS/2 but got stung when Microsoft dropped it. Microsoft's disinterest in multivendor standards, such as OpenDoc, or in publishing some of its application program interfaces are among Whitcher's gripes.

But not everyone agreed. "I think the Justice Department could spend my money better," Simon & Schuster's Brass said. ■

MICROSOFT ANTITRUST SAGA



February 1993
Federal Trade Commission investigates Microsoft's marketing practices; Justice Department later takes up probe.

July 1994
Microsoft agrees to consent decree, changing operating system licensing practices and modifying its nondisclosure agreement policies.

February 1995
U.S. District Judge Stanley Sporkin rejects consent decree; Microsoft and Justice join in appeal.

April 1995
Justice files suit to stop Microsoft/Intuit deal.

May 1995
Microsoft and Intuit drop merger plans.

June 1995
Federal Appeals Court reinstates consent decree.

June 1995
Justice launches investigation of The Microsoft Network.

AT&T links its PBX to Ethernets over TCP/IP

Company aims to unify management of voice, data nets.

By David Rohde

Basking Ridge, N.J.

AT&T later this year will become the first of the three largest private branch exchange manufacturers to offer a direct connection from a PBX to Ethernet-attached devices via TCP/IP.

The 10M bit/sec Ethernet link in Version 4 of Definity Communications System G3, due to be released in the fourth quarter, will replace AT&T's traditional ISDN Basic Rate Interface between the PBX and host computers or LAN servers.

The immediate beneficiaries will be call centers that need to pass customer data from host databases to agent screens as customer calls arrive. But AT&T is also positioning the TCP/IP link as a platform to further its goal of integrating management of voice and data networks.

The Definity LAN Gateway's new circuit packs allow as many as four interfaces per board to file or application servers, rather than the one per board allowed under the ISDN setup — a boon for call centers requiring access to multiple customer databases and applications. The change also eliminates the bottleneck caused by the 16K bit/sec limit of the ISDN D channel in switch-host link.

"With the BRI connection, there was not enough throughput," said Allan Sulkin, president of TEQConsult Group, a PBX consultancy in Hackensack, N.J. "Customers were saying there was a backlog of messages and signals.

Creating an edge

AT&T officials also hope the new release — which combines new software with the circuit packs — will spur independent software companies to build more computer-telephone integration applications. "The ISVs [independent software vendors] were more comfortable writing to TCP/IP than to Basic Rate," said Charlie Fallon, strategic market manager for the Definity system at AT&T.

AT&T's move gives it an edge over the next two largest PBX manufacturers — Northern Telecom, Inc. and Siemens Rolm Communications, Inc. — although TCP/IP support is found on stand-alone automatic call distributors made by Rockwell International Corp.'s Switching Systems Division and Aspect Telecommunications Corp.

"Rockwell and Aspect also have TCP/IP support," Sulkin said, "but [AT&T is] the first of the Big Three to have this, and that's what counts."

The TCP/IP link is expected to advance AT&T's development of unified voice and data network management using the Simple Network Management Protocol, in a project known as OneVision.

Currently, Definity management is achieved largely through a proprietary dumb Management Terminal. Users of Hewlett-Packard Corp.'s OpenView or the StarSentry management package developed by NCR Corp. — the forerunner to AT&T's Global Information Solutions computer unit — can diagnose Definity faults with a proxy agent that converts Definity messages to SNMP, Fallon explained.

Rerouting traffic

But once a fault is recognized, the user still has to reroute the traffic, she said. "Today, the purpose is to manage the network, not the switch," Fallon said.

In Version 4 with the Definity LAN Gateway, the proxy agent is no longer needed, and "the Definity can now truly be an element in the network management system," Fallon said. She cautioned that additional work will be needed, even after the release of Version 4, to actually enable system administration of the PBX using an SNMP-based network management system.

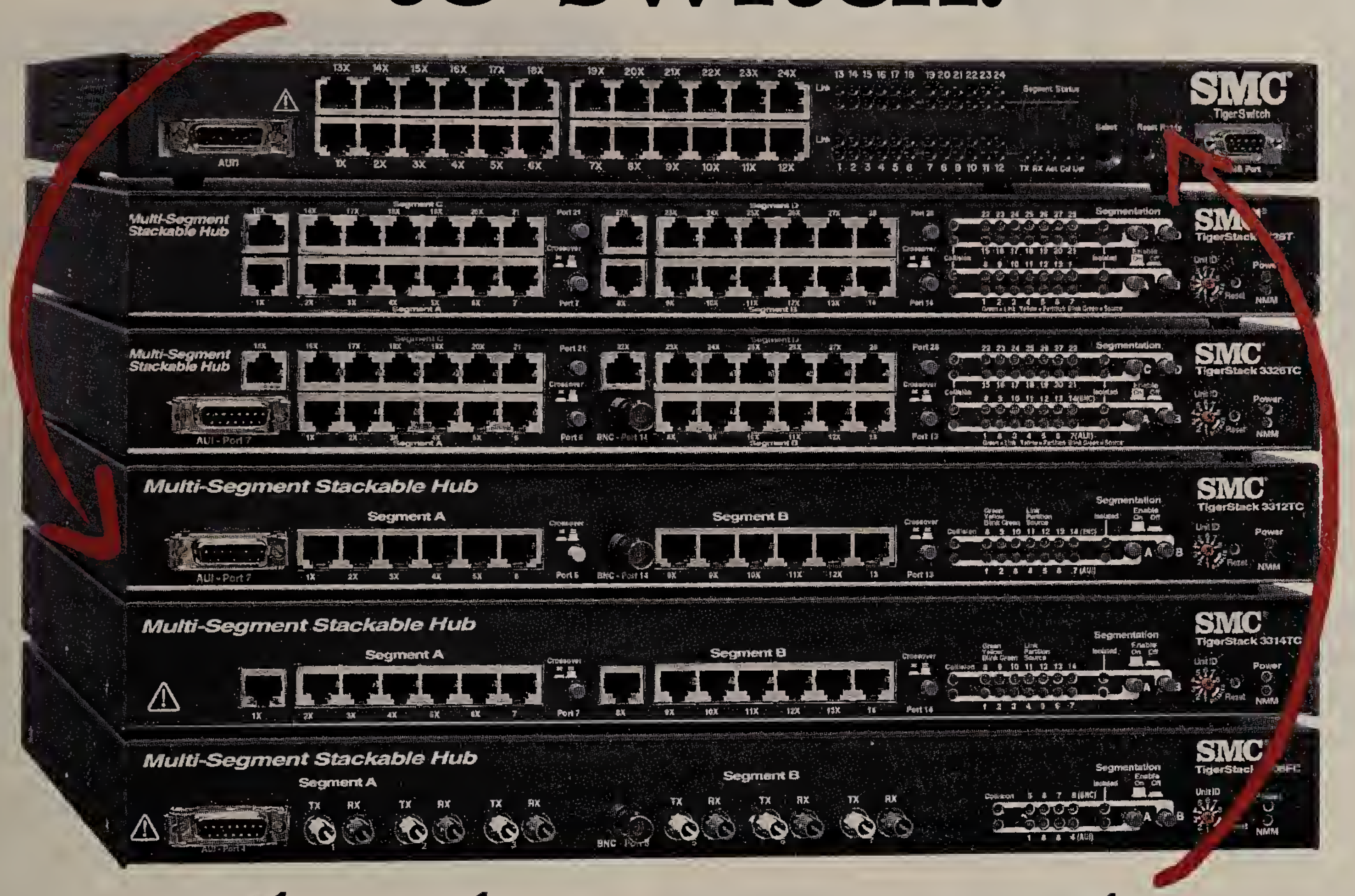
The Version 4 software release will include several other enhancements, notably, a feature that enables a call center to identify the kind of telephone a caller is using. ■

CLARIFICATIONS

Contrary to an analyst's assertions, Telebit Corp. routers do support IPX (June 12, page 26).

Due to a reporting error in "IBM to release app framework on AIX" (June 12, page 35), the amount of disk space needed to run the Taligent, Inc. application framework was inaccurate. The correct amount is 30M to 40M bytes.

The best stack to switch.



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Bay Networks one year later: thriving while awaiting ‘synergy’

By Jim Duffy
Santa Clara, Calif.

One year after Wellfleet Communications, Inc. and SynOptics Communications, Inc. set off fireworks by launching the $1.2 billion “merger of equals” that created Bay Networks, Inc., the combined company is thriving financially. But users and analysts said they have yet to see evidence of the product synergy promised by the company’s executives.

Despite laying out the BaySIS blueprint for switch/router integration, the industry is still waiting for Bay Networks to deliver the “new shiny thing” promised when Wellfleet and SynOptics executives discussed the rationale behind the merger last year.

The new shiny thing is an integrated router/switch combining the technological jewels of Wellfleet and SynOptics in a product line intended to catapult customers into the switched virtual Asynchronous Transfer Mode network realm of the future.

“The thing that we’re looking to get resolved is their ATM strategy for the future,” said Louis Cureau, senior IT specialist at Entergy Services Co. in Gretna, La. “They’ve got [the LattisCell switch], they just bought Centillion [Networks, Inc.], and they may be planning to do something with the Backbone Concentrator Node router. Those are three options, and I’m not sure at this point what the strategy is for ATM.”

Integration anticipation

Larry Foster, coordinator of internetworking services for Southern Illinois University in Edwardsville, wants to see Bay Networks integrate Wellfleet and SynOptics enterprise backbone equipment. “They promised they’re going to be doing that,” he said. “There needs to be a ‘Big Pipe’ between their BCN and their System 5000 hub.”

Bay Networks will initiate this integration — and introduce the new shiny thing, also known as LightSabre — when it delivers virtual network routing on the System 5000 in the fourth quarter, said Paul Severino, chairman of Bay Networks.

As for an ATM strategy, the company will add routing and ATM switching capabilities to its high-end System 5000 hub and position it as a high-end backbone switch. Then other switches, such as LattisCell, EtherCell and those from Centillion, will provide high-performance switching to workgroups and departments, as well as high-speed downlinks to the System 5000, he said.

Aside from that, Severino said Bay Networks has accomplished several things in the year since the merger was announced. The company consolidated the sales organizations of Wellfleet and SynOptics into one. Indeed, users now say they deal with one representative for hubs and routers, instead of two.

Bay Networks also formed three product business units — router, hub and “synergy,” the latter for router/hub/switch products. And the company has delivered on initial product integration such as unveiling a routing hub for remote sites.

“I would give us a pretty high grade in terms of doing what we said we were going to do in forming the organization the way we said we would, in not disrupting the product development cycles and in growing [the router and hub] businesses,” according to Severino.

“We’re pretty pleased about our progress,” he added. “Our stock is up almost double from where it was the day we announced the merger. We’ve shown the world that at least you can execute a merger of two technology companies and do it in a way that will not cause disruption.”

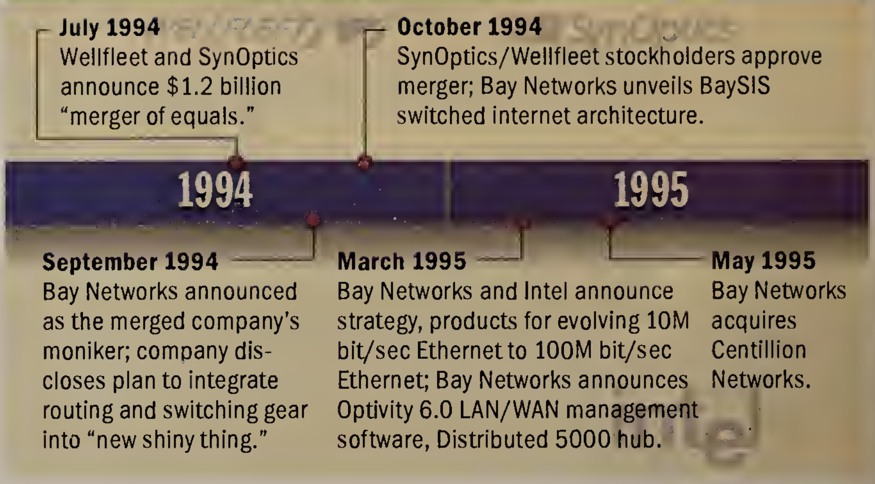
Analysts concurred. They said mergers of this magnitude take about two years to settle.

“It’s just a bear to merge East Coast/West Coast hub/router companies that are different cultures from both a technology and a geographical sense,” said John Morency, a principal at The Registry, Inc., a Newton, Mass., consultancy.

Todd Dagres, an analyst at Montgomery Securities in San Francisco, said he would give Bay Networks a B+ on its report card. “Wall Street is saying that the merger appears to be working” based on the stock price, he added. “But we haven’t seen the product integration. That takes a while.”

Dagres cautioned that the financial results are not due to the success of the merger, but rather from favorable product cycles on the SynOptics side and Wellfleet “holding its own.” There is no evidence of Bay Networks losing significant market share to Cabletron Systems, Inc. or Cisco Systems, Inc. ■

Happy anniversary, Bay Networks



July 1994
Wellfleet and SynOptics announce $1.2 billion “merger of equals.”

October 1994
SynOptics/Wellfleet stockholders approve merger; Bay Networks unveils BaySIS switched internet architecture.

September 1994
Bay Networks announced as the merged company’s moniker; company discloses plan to integrate routing and switching gear into “new shiny thing.”

March 1995
Bay Networks and Intel announce strategy, products for evolving 10M bit/sec Ethernet to 100M bit/sec Ethernet; Bay Networks announces Optivity 6.0 LAN/WAN management software, Distributed 5000 hub.

May 1995
Bay Networks acquires Centillion Networks.

Bay Networks’ financial picture

The company has reported financials for two quarters since forming.

	Bay Networks		SynOptics and Wellfleet (combined)	
Quarter	3Q fiscal 1995 (ended March 31)	2Q fiscal 1995 (ended Dec. 31, 1994)	3Q fiscal 1994	2Q fiscal 1994
Revenue	$337.1 million	$314.2 million	$265.1 million	$276 million
Earnings	$46 million	-$3.6 million*	$32.3 million	$89.7 million

*Largely the result of charges covering the SynOptics/Wellfleet merger.

COMMENTS?

See “How to reach us” on the Opinions pages.

EDI

Continued from page 1

more flexible processing.

In order to migrate, LTV Steel must modify the more than 40 transaction sets it uses, such as purchase orders and advance shipping notices, on a new Unix EDI platform to ensure they mesh precisely with those used by trading partners. Dual support of mainframe and client/server systems during the cutover could last two years.

“We’re going to have to be very careful this doesn’t impact anyone else,” said Larry Acord, LTV Steel staff systems analyst who heads the steel company’s EDI division. “But our reengineering may bring a lot of new requirements, such as a demand to include drawing or reference numbers, that we’d have to pass along.”

Critical exchange

Exchanging EDI messages electronically instead of in paper form is critical to LTV Steel’s business operations.

The railroad companies, for example, will turn back a train car bearing a shipper’s goods if the shipper’s EDI advance notice does not reach the station before the rail car arrives, said Jerry Heckerman, LTV Steel’s vice president of IS.

Once LTV Steel chooses new Unix-based EDI translation and mapping software, there will be the inevitable fine-tuning of the standard EDI X12 formats and fields to ensure proper mapping across a variety of communication links to software used by trading partners.

The struggle between different EDI trading partners to resolve different interpretations of the EDI X12 standards has long been a problem. As a veteran user, LTV Steel has staff dedicated to resolving EDI disputes with trading partners about the interpretation of X12 formats.

“Sometimes we have to do what they ask, or we reach a compromise,” said Laura Graber, LTV Steel’s coordinator of commercial services. The end result is often the need to write custom code to accommodate various demands.

While the road to EDI client/server is daunting, Acord sees many positives ahead. Switching from mainframe to Unix-based EDI software will cut the time for setting up new EDI transaction sets shared with business partners from 40 hours to eight, he noted.

LTV Steel will also be able to expand the use of EDI to trucking companies for freight dispatch using the EDI 858 bill of lading standard for weight, destination and pickup. “With automated EDI dispatch, we find out within minutes whether a truck company can accept the load of steel,” Acord said. “An EDI response is easier than using the phone.”

Also as part of LTV Steel’s reengineering goal, the company is focusing on improving EDI communications with the steel cutters/processors and warehouses that handle finished steel but use a proprietary EDI format called COMPORD.

COMPORD, developed by the American Iron and Steel Institute, is being replaced with an X12 standard format that adds room for purchase order information so steel companies will not have to fax orders to the steel cutters/processors and warehouses, as they do today, said Gary Marzec, LTV Steel’s manager of inventory control.

While there are challenges ahead, LTV Steel’s IS professionals are armed with plenty of experience.

LTV Steel staffers, who helped write the standards book for EDI in the 1970s, have been through the migration wars before.

Working with the Transportation Data Coordinating Committee (TDCC) in 1975, Walter May, LTV Steel’s manager of traffic systems, helped develop the original transaction sets for advance ship notices detailing rates and routes used by the railroad industry. In 1983, LTV Steel began invoice freight billing with Conrail, Inc., which was an industry first.

TDCC developed mainframe freight billing software for its members. But due to the lack of vendor interest in the fledgling EDI industry, there was little commercial mainframe software available until the late 1980s, May added. It was only in 1992 that LTV Steel completed a two-year migration that swapped out the TDCC and home-brew mainframe EDI applications for commercial EDI batch-processing software, finally choosing Sterling Software, Inc.’s Gentran for MVS package.

When LTV Steel decided that dial-up batch processing via the Sterling EDI network was too slow, Sterling rewrote the batch translator to run as a CICS application and provided an interactive LU 6.2 link to its Dublin, Ohio, mainframe. ■

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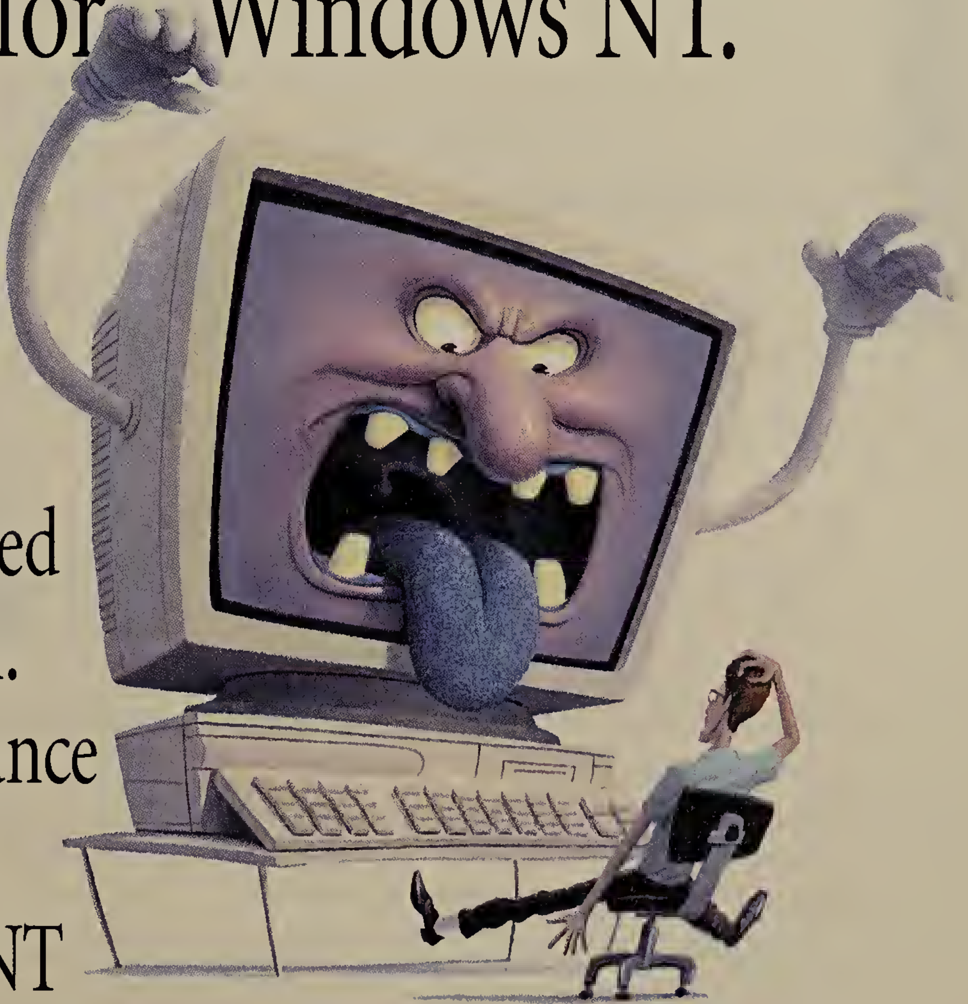

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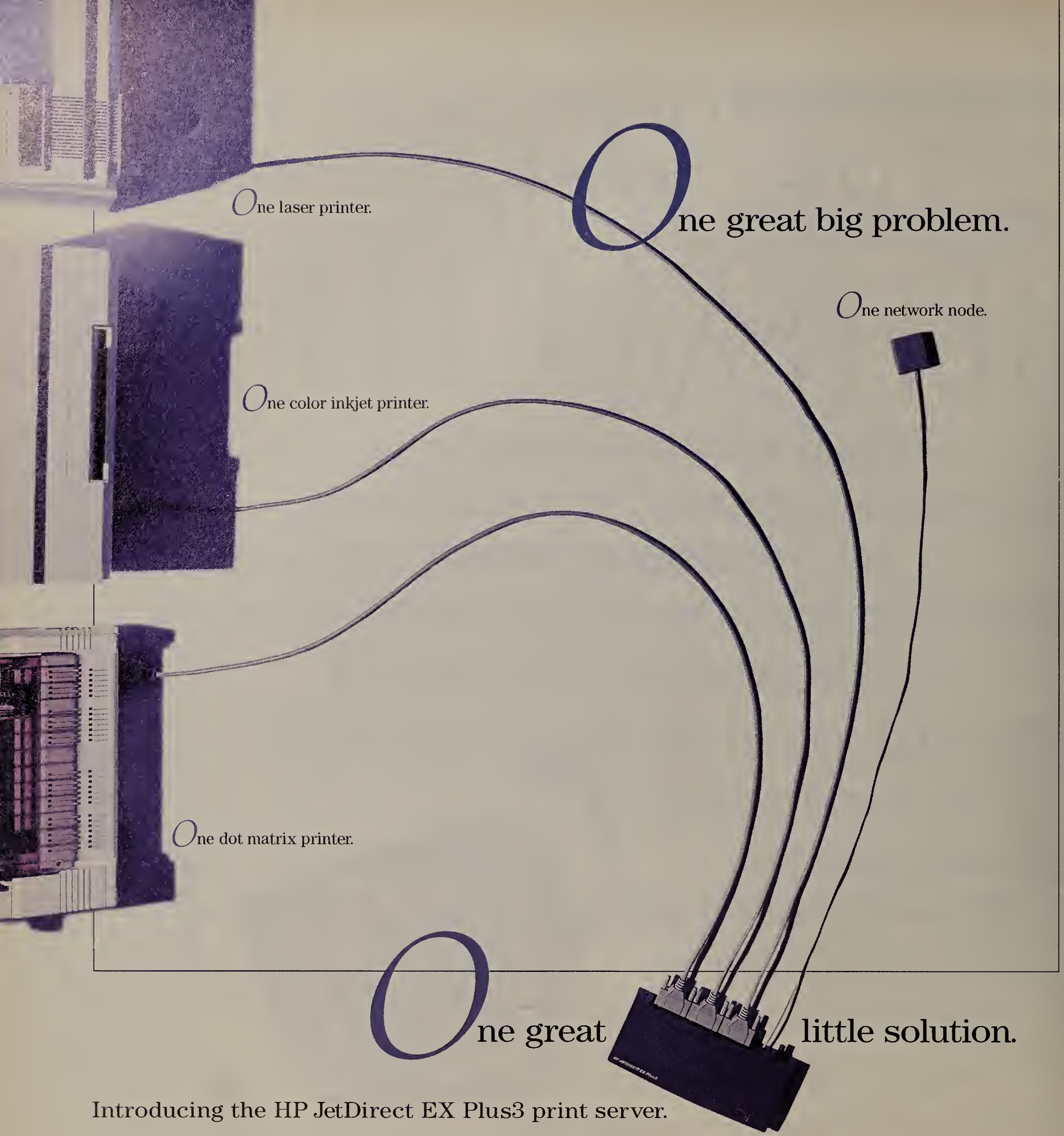

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WANs & Internetworking

Covering: Network Architectures • Net Management • Mobile Computing
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Briefs

■ *Last week,* **ComStream** *introduced VSATPlus II, a modular* **satellite terminal** *that supports voice, data and video applications plus mesh connectivity of up to 1,000 nodes at speeds from 250K to 8.75M bit/sec.*

An optional StreamView Network Management System allows net managers to dynamically reconfigure connectivity, bandwidth and service mix.

The terminal is scheduled to ship in the third quarter.

ComStream: (619) 458-1800.

■ **Computerm Corp.** *announced universal* **data compression** *support for its mainframe channel extenders that lets users link multiple devices on a single channel over unlimited distances.*

The Universal Compression product features 5-to-1 data compression in certain configurations and promises to cut data communications costs in half between remote sites and the data center.

Computerm: (412) 391-7804.

■ *Three router vendors have unveiled* **remote access devices** *for branch office environments. Last week,* **Cray Communications, Inc.** *rolled out MatchBox Router, which sports two T-1/E-1 WAN links and one Ethernet port. Priced at $1,495, MatchBox Router is available now.*

Retix *launched RouterXchange 7220, which supports the Dynamic Host Configuration Protocol and a PCMCIA port for flash memory upgrades. The 7220, available now with one or two WAN links and a single Ethernet port, costs $1,895 to $2,195.*

Proteon, Inc. *said it is now shipping the RBX 205, which sports two ISDN WAN links and a single token-ring or Ethernet interface. The 205 is priced at $2,690.*

Cray: (800) 359-7710; Retix: (310) 828-3400; Proteon: (508) 898-2800.

CompuServe offers Internet, IP services

By Tim Greene
Birmingham, England

CompuServe, Inc. last week announced five service options for business users that want Internet access or dial-up IP access to their own nets through CompuServe's worldwide value-added network.

The services introduced at Networks '95 here complement some existing CompuServe offerings and take advantage of Internet access software the company controls through its purchase earlier this year of Spry, Inc.

The offerings include a standard Internet dial-up access service, called Internet Dial, that will be billed at an hourly rate, according to Jason Comstock, CompuServe manager for IP and Internet services.

Customers can access the Internet from anywhere on the CompuServe network, which includes points of presence in about 140 countries, including 19 new locales in which access will be provided through an agreement with The SITA Group's data network.

New CompuServe choices

CompuServe has five new dial-up IP and Internet offerings:

- **Internet Dial:** Dial-up Internet access
- **IP Link:** Dial-up access to corporate TCP/IP nets
- **Internet Link:** Dedicated Internet link via CompuServe's Frame-Net frame relay service
- **Internet Link Plus:** Adds firewall security to Internet Link service
- **IP client software:** Internet in a Box, Mosaic in a Box and Internet Office offered for sale or lease to users of CompuServe Network Services

Currently, users can dial in at speeds of either 14.4K or 28.8K bit/sec, depending on location, but by May 1, 1996, CompuServe will support 28.8K bit/sec access across its entire network.

Getting linked

CompuServe also announced Internet Link and Internet Link Plus, which provide dedicated frame relay access to the Internet. Those services are based on CompuServe's Frame-Net frame relay service, which is available in the U.S. at 32K, 56K, 64K, 128K, 256K, 384K and 512K bit/sec. In Europe and the Pacific Rim, it is available at 32K and 64K bit/sec.

The service is billed at a flat monthly charge based on bandwidth. Pricing for this and the other offerings is being finalized for release within the next few weeks, Comstock said.

Internet Link Plus offers, for a onetime fee, firewall protection through either Trusted Information Systems, Inc.'s Gauntlet Firewall or CheckPoint Software Technologies, Ltd. Firewall-1.

CompuServe also announced availability, through sale or lease, of Internet and World-Wide Web

See **CompuServe,** *page 16*

User finds no pain, no gain

J.D. Edwards, CAP work through various mishaps and find themselves building a new, stronger relationship.

By Tim Greene
Denver

Software vendor J.D. Edwards & Co. found out that you can save money by going with a competitive access provider, but you have to work closely with the carrier, and sometimes you have to make compromises.

When J.D. Edwards discovered that Intel-Com Group (ICG) could provide the 15 T-1 lines it needed for a total of $2,000 per month less than what US WEST, Inc. charged, the firm jumped at the chance. Not stopping there, J.D. Edwards decided to let ICG tackle the job of setting up a transparent LAN connection between its two buildings here.

ICG's *Bryan says the firm provides competitive access in 32 cities and plans to expand into smaller locations.*

ICG is 6 years old and provides competitive access in 32 cities with populations ranging from 250,000 to two million. It recently named a new president, J. Shelby Bryan, who said he plans to expand into more small cities, leaving the major downtowns to larger CAPs.

Since hiring ICG last year, J.D. Edwards has gotten up and running with the 15 T-1 links to its long-distance carrier, MCI Communications Corp., according to Dave Baumgarten, manager of systems engineering for J.D. Edwards.

ICG linked J.D. Edwards' buildings with fiber-optic circuits supporting four 4M bit/sec token-ring connections, one 10M bit/sec Ethernet connection and four T-1 links to carry long-distance calls received at one building over to the other.

That setup was supposed to provide a transparent LAN connection for the 600 users on the token-ring LANs in the two

See **CAP,** *page 18*

FCC gives big carriers more 800 numbers, but supply still limited

By David Rohde
Washington, D.C.

FOLLOW UP

The Federal Communications Commission has altered the formula for rationing 800 numbers so that larger carriers won't have to say no to nearly every user that comes looking for toll-free service.

The move was requested by AT&T in a rapid-fire series of letters to top FCC officials after the commission last month ordered Bell Communications Research to deliver a ration of only 200 numbers per week to each carrier (*NW,* June 19, page 1).

With more than seven million of the slightly more than 7.7 million legal 800-number combinations taken, the FCC is attempting to prevent the numbers from running out before the new 888 toll-free area code takes effect, probably next April.

"The first week was a very difficult environment, and our customers were calling us and the FCC to register their concerns," explained Ken Sichau, an AT&T vice president for marketing.

Under the new, more liberal allocation formula (see graphic), AT&T is able to meet demand for 800 numbers "in most, if not all, cases" but only because carrier reps are suggesting alternatives to users that request batches of 800 numbers, Sichau said.

NEW FORMULA

Every week, each carrier gets 25 800 numbers plus an amount proportional to the carrier's total base of 800 numbers as of Aug. 1, 1994. In this fashion, 28,000 numbers are split weekly among 138 carriers and other specialized organizations.

For example, many users ask for a separate 800 number for each product offer handled by an individual call center. In these cases, the carrier is promoting the use of a single 800 number, combined with its network-based voice prompting system to identify the reason for the call. It is also suggesting alternatives using the carrier's 500, 700 and 900 services.

FCC officials claimed that they had considered the new formula early on but were reluctant to disclose the idea for fear it would set off a new scramble for 800 numbers.

"We couldn't go to the carriers and ask for market share because we're about to allocate 800 numbers," an official with the FCC's Common Carrier Bureau told *Network World.* "That's sort of like saying, 'We're about to shut your bank, so come take out your money.'"

Rationing 800 numbers isn't the FCC's only numbering chal-

See **800 numbers,** *page 16*

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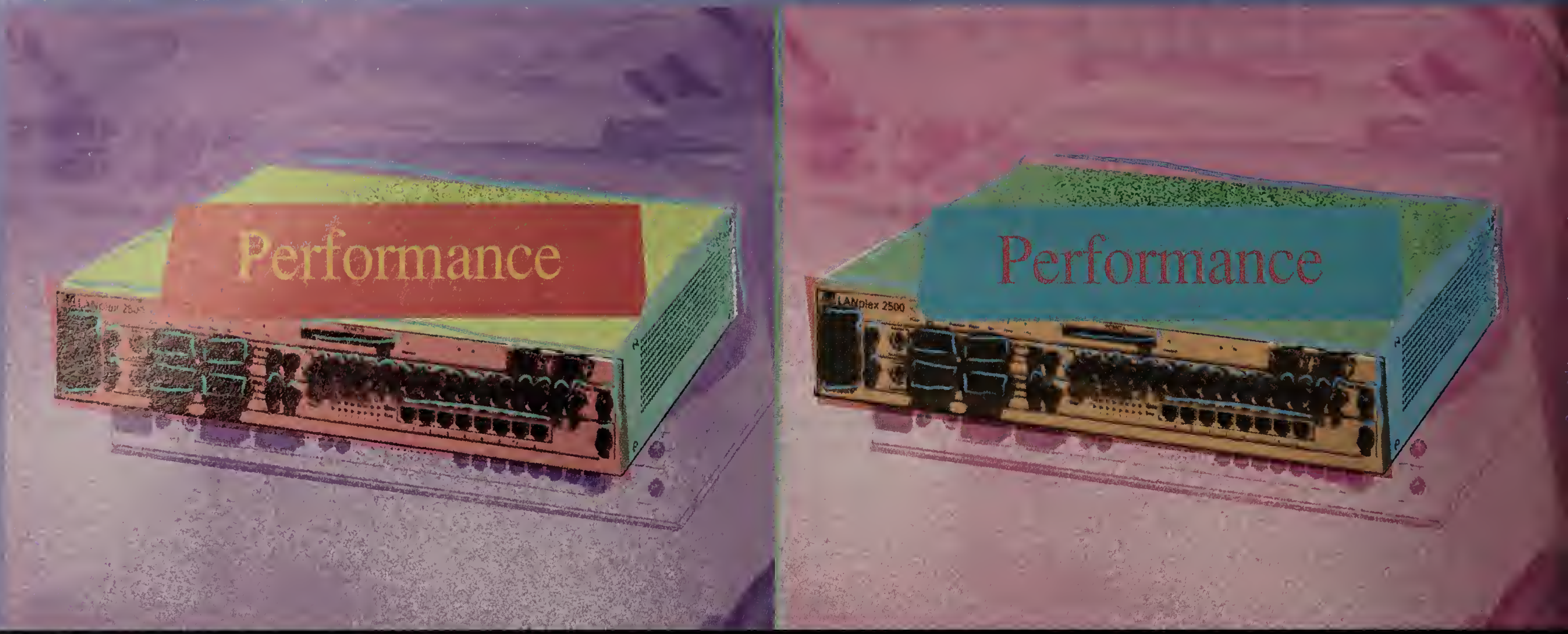
APTERS SWITCHING HUBS ATM SOLUTIONS



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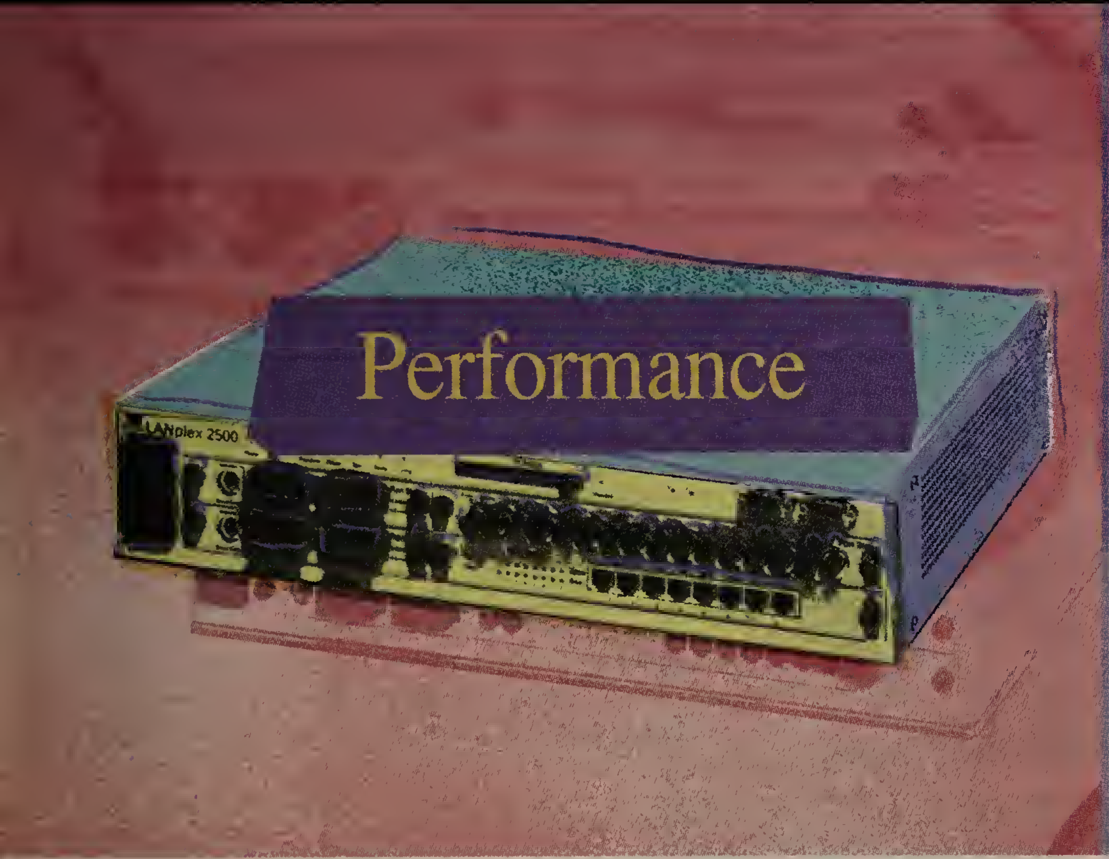
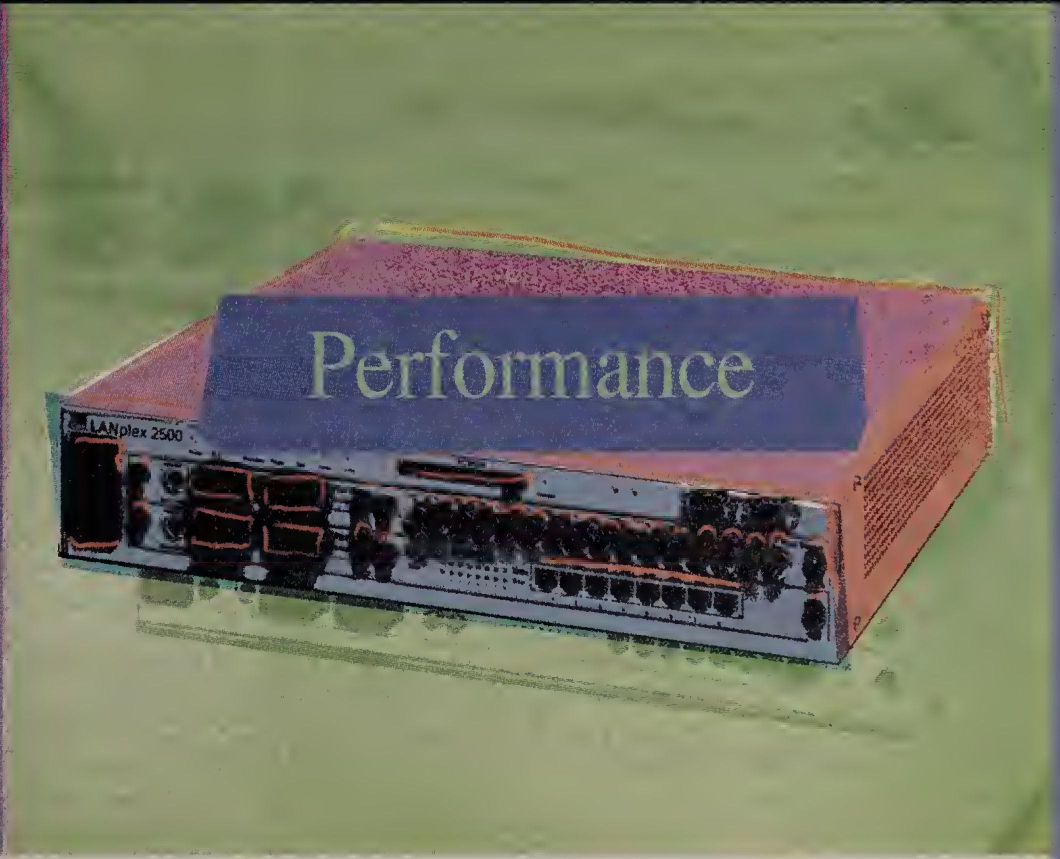
give you that Cisco can't?





3Com can offer this unsurpassed power at such a low price. Not Cisco.

And the LANplex 2500 gives you features like two switched FDDI ports, virtual LAN support and Elastic Packet Buffering. Plus, you'll have a simple upgrade path to high-speed technologies. From FDDI today to 100BASE-T Fast Ethernet or ATM tomorrow, 3Com prepares you.

For more information on an unrivaled range of workgroup and data center switching products, and to receive a free copy of the LANplex 2500 performance report, don't call Cisco. Call **1-800-NET-3Com.**

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NETWORKS THAT GO THE DISTANCE

Performance comparison based on maximum forwarding rate tests with zero packet loss. Tests performed at the Harvard Network Device Test Lab. LANplex 2500 forwarded 562,254 pps in a 1 FDDI-FDDI stream plus 8 Ethernet streams test (2/95). Cisco Catalyst 1200 forwarded 55,026 pps in a 6 stream Ethernet-to-Ethernet via FDDI test (8/94). Price comparison based on list price per switched segment.

Cisco, CrossComm fill out ATM, switching arsenals

Companies add weight to their switched internet visions.

By Jim Duffy

Cisco Systems, Inc. and CrossComm Corp. have added more meat to their switched internetworking strategies with the introduction of ATM switches and software.

Cisco rolled out enhancements to its Internetwork Operating Systems (IOS) software designed to enable its routers and switches to be deployed in large scale Asynchronous Transfer Mode nets. CrossComm unveiled an edge router for connecting LANs to ATM backbones, and a LAN switch designed to shuttle traffic across the ATM backplane of the company's XL router chassis.

Switch-hitters

Vendor	Product	Enhancements/options
Cisco	Cisco 7000 router	• LAN emulation • RFC 1577
	LightStream 100	• Point-to-multipoint signaling • Dynamic Interim Inter-Switch Signaling Protocol • Interim Local Management Interface
	LightStream 2020	• Multicast services over point-to-multipoint connections • Application Specific Quality of Service
CrossComm	XL router chassis	• XLT Backbone LAN Switch • XLT-F ATM Edge Router

For the ATM interface of its high-end 7000 router, Cisco has added LAN emulation software to IOS. This enables users to mix ATM devices with the routers and LAN switches in their networks without installing new network protocol stacks and applications, Cisco said.

Cisco also added RFC 1577 support to the 7000, which allows users to run IP traffic natively over ATM nets.

Other Cisco enhancements

For its LightStream 100 workgroup/campus ATM switch, Cisco added IOS enhancements that enable the device to automatically set up connection paths and map addresses, rather than requiring the network administrator to perform these tasks manually. The enhancements include support for point-to-multipoint signaling, the Dynamic Interim Inter-Switch Signaling Protocol and the Interim Local Management Interface.

And on the LightStream 2020 backbone ATM switch, Cisco has added multicast services that utilize point-to-multipoint connections, and Application Specific Quality of Service. Multicasting allows administrators to broadcast data to specific groups of users rather than to the entire network. The quality of service software extends ATM-level service quality to Fiber Distributed Data Interface and Ethernet traffic, ensuring that that traffic is allotted as much bandwidth as needed.

"They're making LightStream more palatable to a wider range of users," said Jennifer Pigg, director of data communications at The Yankee Group in Boston.

All of the ATM enhancements will be available in August.

CrossComm introductions

CrossComm, in the meantime, announced the XLT Backbone LAN Switch and the XLT-F ATM Edge Router. Both products are modules for the company's XL router chassis.

The XLT connects Ethernet and token-ring LANs over the ATM CrossPoint Matrix backplane on the XL chassis to provide high-speed switching of LAN frames between XL modules. The XLT can also route IP and IPX traffic, and supports bridging.

The XLT-F connects Ethernet and token-ring LANs to ATM WANs. It, too, sports four Ethernet or token-ring LAN interfaces and a single full-duplex 155M or 45M bit/sec WAN link, and can also route IP and IPX data.

The XLT is priced from $7,995 to $13,995, while the XLT-F costs from $12,495 to $22,495. Both products are available now.

☎Cisco: (408) 526-4000; CrossComm: (508) 481-4060.

Alcatel rolls out virtual LAN products over the wide area

By Michael Csenger
Reston, Va.

Alcatel Data Networks has joined the narrow ranks of vendors that can deliver networking products from the desktop to the enterprise and carrier levels.

Fleshing out the Avanza strategy it announced last March and consummating its relationship with LAN switch vendor Xylan Corp., Alcatel recently introduced the 1100 LAN Switching System (LSS). With a strong focus on virtual LAN management, the 1100 LSS is an Asynchronous Transfer Mode LAN backbone switch that supports a mix of ATM, Ethernet, token-ring and FDDI switching.

Xylan sells the device by the name OmniSwitch. Alcatel is not simply reselling the same switch but rather has integrated its own network management system into the product and is working on further enhancements that will define it uniquely as Alcatel's own offering.

"You'll be seeing more integration into the overall Avanza strategy by the end of this year," said David Allen, Alcatel's vice president of marketing. "We're including congestion management, signaling, frame relay interfaces and more ATM switching features that will flesh it out as an Alcatel product all its own."

The Avanza strategy is Alcatel's promise of unified ATM and frame relay switching from desktop to desktop across wide-area enterprise and carrier networks. The 1100 LSS adds to this a well-regarded virtual LAN capability that will give Alcatel a unique selling point, analysts said.

Virtual LANs promise simplified management across LAN backbones, easing the chore of network moves, adds and changes, while also making it possible to create logical workgroups, regardless of end-user locations. Alcatel plans to extend this capability over the wide area, using both frame relay and ATM services.

> *"You'll be seeing more integration into the overall Avanza strategy by the end of this year," said Alcatel's David Allen.*

"The crux of the 1100 LSS is Xylan's virtual LAN technology," said Tim Wilson, senior analyst at Decisis, Inc., a consultancy in Herndon, Va. "What Xylan does with virtual LANs is very efficient. It works better across multiple switches than other approaches do, and it lends itself very well to extension across the wide area."

Other companies with similar LAN/WAN strategies include Newbridge Networks, Inc., the Northern Telecom, Inc./Fore Systems, Inc. partnership, and Cisco Systems, Inc. with its recently acquired LightStream switch.

Issues remain

Fully integrating the 1100 LSS into the Avanza design will be a considerable challenge, and whether Alcatel will be successful remains to be seen, Wilson noted. "What they have now is just what Xylan already does — just a local virtual LAN capability," he said.

There also remains the question of user demand for extended virtual LAN capabilities, said Jennifer Pigg, director of data communications at The Yankee Group in Boston. "There may be a market for it, but first we'll have to see what users make of virtual LAN capabilities, period. There are some pockets of demand, but most users aren't yet convinced."

Both analysts noted that Alcatel's more immediate challenge will be to build a presence in the U.S. Alcatel is best known as an international provider to phone companies and is not well known to corporate net managers.

☎Alcatel: (703) 689-7400.

CompuServe

Continued from page 13

software from the former Spry. They include Internet in a Box, Mosaic in a Box and Internet Office.

CompuServe also announced IP Link, which is designed to let users access their corporate networks via a local call, Comstock said. Billing is based on hourly use, a monthly router lease charge plus a monthly dedicated line fee. The service supports access at 14.4K or 28.8K bit/sec.

The services sound like a logical extension for CompuServe, said Rob Kirky, the electronic services manager at Great Plains Software, Inc. in Fargo, N.D. "They have a choice of fighting the Internet or embracing it," he said. Kirky's company uses CompuServe's Enterprise Connect service, which provides Lotus Development Corp.'s Notes online.

CompuServe can offer content that a small Internet access provider cannot, and users can access the Internet with a local call, even when they are not near their home office, he said.

Kirky added that the frame relay offering would have to be priced aggressively. Great Plains is pricing connectivity for its Web site and is finding a wide range of costs. CompuServe would have to come in near the low end to be attractive, he said.

Glenn Gabriel Ben-Yosef, president of Clear Thinking Research, Inc., a market research firm in Boston, said the CompuServe offerings mirror similar services already offered by Advanced Network and Services, Inc. ■

COMMENTS?

See "How to reach us" on the Opinions pages.

800 numbers

Continued from page 13

lenge these days.

The agency and other regulatory bodies are wrestling with problems that have cropped up in states that are implementing new area codes for regular toll calling.

For example, on June 22, the Arizona Corporation Commission, in an unprecedented move, ordered US WEST, Inc. to undertake or participate in a national advertising campaign alerting people to a new area code within the state.

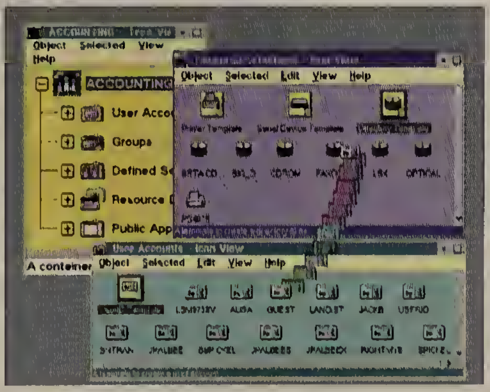
Area code 520, which serves outside the Phoenix metropolitan area, went into effect on March 19 and was due to become mandatory on July 23 before the Corporate Commission ordered a 90-day delay.

Dozens of Arizona users have complained that they cannot receive calls placed to the new area code from overseas and businesses whose private branch exchanges have not been programmed to accept area codes without the traditional 0 or 1 middle digit. Similar complaints have been heard following recent area code changes in Alabama and Washington state (*NW*, May 15, page 6).

The Arizona commission also demanded that US WEST work closely with the FCC to come up with ways to "provide incentives for the upgrade of old or obsolete [PBX] equipment."

But the FCC has never taken a role in mandating such an upgrade, which would require many users to shell out their own money. Expected from the FCC this summer is a series of regulatory initiatives exploring such issues as who should administer the national numbering plan and who should get first crack at the new 888 numbers when they become available. ■

Will your network grow into a majestic oak, or raging crabgrass?



"...LAN Server 4.0 sports a modern, graphical interface that meets the expectations of the Windows™ generation of users."
– PC Magazine
May 30, 1995

"Departmental NOS of the Year-LAN Server 4.0 Entry."
– LAN Magazine
April 1995

Award-winning LAN Server 4.0

It all depends on your software. IBM® LAN Server 4.0 will actually make your network so manageable you actually look forward to dealing with it.

How did we transform a task that at best was considered a chore? For a start, we made LAN Server 4.0 much easier to install than other network operating systems. And its powerful new drag-and-drop administration makes adding new users a walk in the park.

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If you would like us to fax you more information about LAN Server 4.0 directly, call 800 IBM-4FAX and request documents 1834 & 1835. Product information and demonstrations are available on the Internet at www.austin.ibm.com/pspinfo. IBM and OS/2 are registered trademarks of International Business Machines Corporation. Windows is a trademark of Microsoft Corporation. © 1995 IBM Corp. All rights reserved.

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CAP

Continued from page 13

buildings, as well as for a much smaller number of Ethernet users. But the connection turned out to be less than transparent.

"What we contracted for isn't necessarily what's being provided," Baumgarten said. "We're not getting true transparent LAN access between these two buildings."

Instead, J.D. Edwards is getting what Baumgarten described as "aggregated synchronous bandwidth." Token-ring traffic is fed through a router at one end of the connection, divided among serial links and pieced back together by a router at the other end. The introduction of the routers creates latency and two potential points of failure, he said.

In March 1994, when J.D. Edwards made the deal, ICG did not have the technical ability to extend the token ring. "They couldn't give me what I wanted, so this was the compromise," Baumgarten said.

The ICG-installed system was up and running for about a year when it crashed this past March, revealing several flaws.

A card went bad in a T-3 multiplexer that ICG provides on-site as part of its service. The mux problem set off alarms at the ICG network control center, but then ICG had to establish a modem connection to the mux to find out what was really wrong. "It's not an SNMP box by any stretch of the imagination," Baumgarten said.

When the card was replaced, the token-ring connection came back up, but the voice portion was failing, which turned out to be due to an inadvertent signaling change back in an ICG switch. Overall, the problems caused a two-day crash, Baumgarten said.

"It's one of those [problems] where you spend a lot of time analyzing and designing, but when you go live with an application, it's just impossible to foresee problems," Baumgarten said. "And when that happens, you learn on the fly.

"We all learned from this one. We weren't being as proactive as we should have been, working with them to make sure we had this thing all buttoned up," he added.

J.D. Edwards' 800-number software support line terminated in one building and was destined for automatic call distributor (ACD) units in the other.

With the outage, "we lost the capability of terminating ACD calls," Baumgarten explained.

At its own expense, ICG bought two copper T-1 circuits from US WEST for backup in the event of another failure.

WHAT IS ICG?

IntelCom Group is a competitive access provider in small cities, a fiber-optic systems integrator, and a satellite uplink and maritime communications provider.

Change is good

But the network management shortcomings of the current design plus increased demand have J.D. Edwards looking to change again.

After putting out requests for bids to ICG, US WEST and Teleport Communications Group, J.D. Edwards last month chose ICG to connect its two buildings with a Synchronous Optical Network (SONET) OC-3 link.

And its previous dealings with J.D. Edwards, while not flawless, might have helped ICG get the new contract.

"When you're in the trenches and you're both bleeding at the same time, it tends to build long-lasting relationships," Baumgarten said. "It's more painful, but in my view, you get better long-term solutions." ■

BusinessBriefs

Sprint Corp. and **Northern Telecom, Inc.** have announced a deal to provide NorTel switching equipment to call centers without an up-front capital investment. Users will be able to pay for their Meridian 1 private branch exchanges with automatic call distribution based on a per-minute-of-use formula associated with their telephone bills.

The arrangement is similar to a groundbreaking deal earlier this year between Sprint and Rockwell Switching Systems Division (*NW*, Feb. 13, page 2).

US WEST, Inc. plans to deploy fiber-optic rings in 33 cities within its territory, with Seattle, Denver and Phoenix to be completed by the end of the year. Rings in Minneapolis/St.Paul, Omaha, Neb., Portland, Ore., and Salt Lake City are scheduled to be built next year.

The rest of the $53 million program will be rolled out over the next four years.

IBM last week reported a yearlong backlog in shipping of its traditional bipolar technology mainframes. Linda Sanford, general manager of IBM's S/390 Large Scale Computing unit, said users ordering a bipolar mainframe today would not see it until the first quarter of 1996 at the earliest. IBM does not face the same problem with its newer complementary metal oxide semiconductor-based mainframes, Sanford said.

Apertus Technologies, Inc. of Eden Prairie, Minn., recently said it intends to buy **Blueline Software, Inc.,** a maker of enterprise network management and security products.

Apertus President Robert Gordon said the acquisition would give the company entree to the enterprise network management application market and new sales channels for its own connectivity products.

Blueline, which is based in Minneapolis, would become a wholly owned subsidiary and be known as Blueline/Apertus Technologies, Inc. Terms were not disclosed.

Apertus: (212) 560-7837.

On the heels of announcing a network printing service trial with **Xerox Corp.** aimed at allowing publishers to electronically distribute content and then print and bind it, **AT&T** last week announced several other partners for its Network Demand Printing Service, including Agfa-Gevaert Group, Eastman Kodak Co., Indigo N.V. and Scitex Corporation, Ltd. AT&T said it has also signed memoranda of understanding with Adobe Systems, Inc. and Quark, Inc. The deals are designed extend the reach of AT&T's service from Xerox DocuTech printers to include printing equipment from Agfa, Indigo, Kodak and Scitex, and make the Adobe and Quark software a key element of the network service.

A new ATM user group has been formed to serve the Southeast U.S., spanning the region east of the Mississippi and from Virginia on south. Hosted by MCNC, a research and technology development center in North Carolina's Research Triangle Park, the **Southeast Region ATM Interest Group** will hold its first meeting on July 31.

The group is open to end users, manufacturers and vendors of Asynchronous Transfer Mode technology. MCNC plans to catalyze the group's activities with the involvement of its Advanced Information Application Center (AITAC).

AITAC's role is to test emerging applications and network services such as ATM across wide-area, multivendor and multiservice environments.

For additional information about the group, please call Nancy Agosta at (919) 248-1196 or contact her at agosta@mcnc.org.

WAN MONITOR

V.34 modems hit digital potholes

Tried flying over the public-switched telephone network with your new 28.8K bit/sec modem? It's like driving a Porsche on a street filled with potholes: The engine wants to go fast, but the road says no.

V.34 modems leave a lot of horsepower on the roadside because of line conditions and other factors. Most V.34 connections run at less than 28.8K bit/sec, and the modems can vary greatly in their ability to handle different types of lines.

Recent TeleChoice lab tests on 11 V.34 modems showed that they achieved 28.8K bit/sec connections less than half the time under network conditions found throughout most of the country. Under some conditions, the modems made 28.8K bit/sec connections less than 10% of the time.

Using simulation tools from Eatontown, N.J.-based Telecom Analysis Systems, Inc., we looked at AT&T Paradyne's 3810 Plus; Microcom, Inc.'s Deskporte Fast; Motorola, Inc.'s 3261, 2400 and Power 28.8; Multi-Tech Systems, Inc.'s MT 2834 and Z Modem; Supra Corp.'s Fax Modem 288; and U.S. Robotics, Inc.'s Courier, Sportster and Total Control modems.

Daniel Briere and Christine Heckart

Some V.34 modems struggle when they encounter digital transmission facilities that implement pulse code modulation (PCM) and adaptive differential pulse code modulation (ADPCM) algorithms, which are frequently employed today.

ADPCM algorithms are the most harmful to V.34 modems. During our testing, these algorithms struggled to operate synchronously at a fixed line rate and were consistently unable to connect at rates above 19.2K bit/sec.

File-transfer throughput also suffered under PCM and ADPCM conditions. As the number of PCM links were increased, the modems' throughput of a graphics file dropped from 5,990 to 5,730 characters per second, a decline of 4.3%.

We also found that throughput suffered more under ADPCM.

The highest throughput achieved was 4,500 characters per second, and throughput dropped as low as 1,720 characters per second.

Part of the science of managing networks and technology is knowing when to implement new technologies.

Selecting the V.34 modem that will work best under your line conditions and with existing modems presents a great challenge.

V.34 modems can improve performance over the 14.4K and 19.2K bit/sec modems they replace. But buyers who want to cost-justify a modem upgrade need to do more than claim they can cut 50% of current transmission costs.

That claim fails to recognize that even the fastest connection will not speed up such user-dependent processes as logon, composing an E-mail message or deciding which file is needed from which directory. This can represent up to half of the on-line time logged by users. It also ignores the fact that most 28.8K bit/sec modems will connect at 24K and 26.2K bit/sec.

Try out a variety of V.34 modems in your shop under the phone conditions your users will likely encounter. This will help you identify the vendors that provide the right mix of options for your environment.

New digital, network-friendly algorithms will boost connect speeds and throughput.

As a result, expect new models and upgrades to appear rapidly. Make sure that the modems you purchase can be upgraded. Several vendors offer flash upgrade options that can protect you from early obsolescence.

Briere is president and Heckart is director of broadband with TeleChoice, Inc., a consultancy in Verona, N.J. They can be reached at danny_briere@telechoice.com or christine_heckart@telechoice.com. They will share this space with Scott Bradner, whose column will appear next week.

Local Networks

Covering: Operating systems • LAN management
Hubs • Adapters and other equipment

Briefs

Standard Microsystems Corp. (SMC) *announced a new high-speed switching chip that allows 100Base-T, 100VG-AnyLAN, Fiber Distributed Data Interface and* **Asynchronous Transfer Mode** *switches to be developed using the same fabric-based silicon. The new Multitechnology Asynchronous Switch (MAX) chip provides scalable bandwidth from 2.5G to 10G bit/sec and can offer as much as 10 times the bandwidth for about double the cost of switched Ethernet solutions.*

The first SMC switch to use the MAX silicon will be the 16-port 100Base-T fast Ethernet switch, which is planned for September.

SMC: (508) 691-1200.

Chipcom Corp. *last week rolled out* **ONdemand Asynchronous Transfer Mode Campus Manager,** *an application that lets users manage ATM networks from a central workstation.*

The software tool controls ATM devices as well as virtual connections among the company's ONcore ATM modules.

Chipcom's ONdemand ATM Campus Manager for IBM NetView AIX is priced at $7,995 and is available now.

Chipcom: (508) 460-8900.

Banyan Systems, Inc. *last week announced an* **enterprise backup product** *for VINES networks.*

Enterprise Backup and Restore (EBR) 1.0 for VINES resides on a single server and can back up any server or workstation on the net that is running EBR agent software. Users can conduct backups from any Windows workstation on the net and can browse directories of stored files to select which should be recovered.

EBR will be available July 31 for $3,000 for the main package, plus $750 per server. Workstation-based agents will cost between $850 for 10 workstations and $8,000 for 100 workstations.

Banyan: (508) 898-1000.

DG to adopt new server tack

Dumps Motorola's processors for Intel's to reduce pricing on Unix-based servers.

By Margaret Dornbusch
Westborough, Mass.

Data General Corp. last week aired plans to switch its AViiON family of Unix-based servers from Motorola, Inc. microprocessors to Intel Corp. processors, a move the company claims will boost server performance and cut costs.

The company, which has shifted its focus from sales of proprietary minicomputers to Unix-based servers and complementary products, considered migrating to a Reduced Instruction Set Computing platform, such as the PowerPC processor being developed by Motorola in conjunction with IBM and Apple Computer, Inc. But the Intel P6 chip — the planned successor to the current Pentium — promised to be the best buy because it will be produced in mass volumes, said David Ellenberger, DG's division vice president for AViiON marketing.

Lower component costs will reduce development and production costs, which, in turn, will help lower server prices, Ellenberger said. The Intel platform also will let users take advantage of a larger number of applications, he added.

The new Intel-based AViiON systems, which will appear before the end of the year, will eventually replace the Motorola-based servers. However, support for existing servers will continue, Ellenberger said. The Motorola-based server line will expand one more time this year with the addition of a 32-processor system and a clustering system that will let customers pull together a maximum of eight servers.

Looking ahead

Next-generation servers will feature Intel's Standard High Volume (SHV) motherboards that combine a maximum of four Intel P6 processors, cache, memory and I/O. A new technology, Non-Uniform Memory Access (NUMA) architecture, will be used to expand server processing power. NUMA systems comprising multiple SHV boards will use shared memory to provide performance similar to massively parallel processing performance, Ellenberger said.

While shifting to Intel, DG has not made the decision to offer Microsoft Corp.'s Windows NT, which other Intel server vendors such as Compaq Computer Corp., Dell Computer Corp. and AST Research, Inc. already offer. DG decided to stick with its implementation of Unix, DG/UX, as its operating system of choice for the next several years.

"We don't see Windows NT yet as a substitute for high-end Unix servers," Ellenberger said.

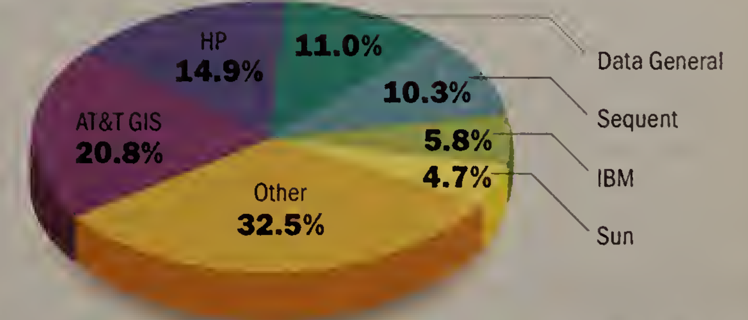
Jonathan Eunice, research director for Illuminata, a Hollis, N.H.-based research company, agreed. "Windows NT has not been proven beyond the LAN level, yet," he said. "I see a pretty robust future for Unix as a database server or an application server. In fact, DG has one of the better Unix versions out there."

If, at some point in the future, Windows NT proves to scale as well as Unix, DG will be in an excellent position to switch over, Eunice added.

©DG: (508) 366-8911.

UNIX MID-RANGE MARKET LEADERS

1994 worldwide revenue from commercial sales of Unix-based mid-range computers priced between $100,000 and $1 million.



GRAPHIC BY TERRI MITCHELL

SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

Madge marries LANNET, gains switching gear

By Jodi Cohen

If one-stop shopping is the name of the game in networking, then you may be hearing more about one longtime player: Madge Networks, Inc.

LANNET's *Fogel says the merger will allow the companies to jointly address the Global 1000 better.*

Madge's recent acquisition of LANNET Data Communications, Ltd. expands Madge's product line to include Ethernet, token-ring and Asynchronous Transfer Mode switching technology, as well as network management tools. That should help Madge as it competes with other top LAN companies, though it still lacks its own routing products.

Madge last year gained access to ATM technology when it took a 10% stake in desktop ATM provider Whitetree Network Technologies, Inc. The company soon plans to announce an integrated product strategy for migrating customers from shared-media LANs to switched virtual networks.

Analysts said the $300 million stock deal for LANNET will boost Madge's presence in the networking market, putting it alongside companies such as Chipcom Corp. LANNET, which posted $70 million in revenue last year, is about one-third the size of Madge, which in 1994 brought in $213 million in revenue.

"After a while, there's only going to be a handful of networking companies left," according to Charlie Robbins, vice president of communications research at consultancy Aberdeen Group, Inc. in Boston. "The companies will all be big and offer end-to-end solutions."

Avi Fogel, executive vice pres-

See **Madge,** *page 20*

Cheyenne bolsters backup, virus scanning wares for Windows NT

By Kevin Fogarty

Cheyenne Software, Inc. is concentrating its efforts on Microsoft Corp.'s Windows NT operating system with an overhaul of its ARCserve for Windows NT enterprise backup software and the introduction of InocuLAN for Windows NT antivirus software.

ARCserve for Windows NT 2.0 features a number of enhancements, including integrated central administration, intelligent alert notification and a virus scan engine, said Mary Fenton-Lee, Cheyenne's Windows NT product manager.

Central administration allows a net manager to view and manipulate backup job queues and servers from a single console, she said. Server and workstation-based agents can send Simple Network Management Protocol alerts to the management console, to keep managers up to date on remote operations, or to users via electronic mail or a pager.

The virus scan engine, the same engine included in InocuLAN for Windows NT, provides an extra check for viruses, but is not to replace normal antivirus procedures, Fenton-Lee said.

Cheyenne targets Windows NT

Product	Price	Availability
ARCserve for Windows NT 2.0	$1,395	3Q
InocuLAN for Windows NT	$895	Now

Adding virus checking to ARCserve was "a real incentive" to buy, said beta tester Chuck Vachter, systems software programmer for the Oregon Department of Transportation. But remote management will be a huge benefit to the agency, which has ARCserve in 25 sites.

"From my office, I can basi-

See **Cheyenne,** *page 20*

New remote control software aimed at help desk staffers

By Peggy Watt

Traveling Software, Inc. expects to ship this summer LapLink Host, a remote control software product aimed at making life easier for technical support staffers.

LapLink Host also requires the use of Traveling Software's LapLink for Windows. The combination enables managers to remotely control, monitor and manage personal computers on a LAN or by remote connection, according to a Traveling Software official. However, for security purposes, users cannot initiate outbound connections.

LapLink Host's remote control facility makes it easy for an IS manager to show users how to carry out functions — or take over for users, even from a distance, said Bob Landolfi, director of sales technology for Scott Foresman Co., a LapLink Host beta tester and help desk manager. "[LapLink Host] sits dormant on the user's PC, and I can call and activate it when I need to," Landolfi added. "It makes it very easy to do remote control, file transfer and any user support."

Landolfi said he especially likes the option of obscuring the user's screen during the remote control operation, in case he doesn't want the user to see a specific procedure.

"Some of my sales reps are very computer illiterate, but I can help and support them effectively even from another office," he said. About the only missing piece is simultaneous voice and data transmission, Landolfi added.

Landolfi said he especially likes the option of obscuring the user's screen during the remote control operation, in case he doesn't want the user to see a specific procedure.

Also, LapLink Host's policy of originating the call and controlling activity from the central site allays security concerns with programs that let remote users call into a corporate LAN, he said.

Another early adopter is Compaq Computer Corp., which is bundling a custom version of LapLink Host with its desktop computers so Compaq support technicians can remotely access a customer's computer for troubleshooting.

Net managers can also configure and distribute custom versions of LapLink Host as needed. A password can be installed, as well.

The new Traveling Software program will support Windows 95, which is scheduled to ship in August, and will also support Windows 3.X. LapLink Host pricing will be announced upon its release; LapLink for Windows costs $199.

©Traveling Software: (206) 483-8088.

Madge

Continued from page 19

ident of global marketing and development for LANNET, agreed.

"Madge realized that you can't just go strictly token ring because if you go into a large enough account, those customers want the best of breed in combined technology," Fogel said.

Madge is hardly alone in gobbling up rivals to expand its product line; of late, consolidation is the rage in the network hardware space.

Bay Networks, Inc. — itself formed from the merger of SynOptics Communications, Inc. and Wellfleet Communications, Inc. — recently snared fledgling token-ring switch provider Centillion Networks, Inc. Cisco Systems, Inc. has also bolstered its switching status by capturing companies such as Kalpana, Inc. and Lightstream, Inc.

Madge makes its move

Analysts agreed that the new Madge will be a force to contend with in the networking arena. Madge owns the second largest chunk of the token-ring market — behind IBM — with 16% of the market, and LANNET holds the third largest market share position in Ethernet switching, according to International Data Corp., a market research firm in Framingham, Mass.

But Michael Howard, president of Infonetics Research, Inc. in San Jose, Calif., said one key shortcoming is that Madge does not have its own routing technology, which could prevent the company from competing effectively with the top networking vendors.

"It would be smart for [Madge] to get their hands on some routing technology," Howard said.

Matthew Wainwright, director of corporate communications at The Nature Co. in Berkeley, Calif., said he may stop making separate purchases of token-ring gear from Madge and Ethernet equipment from 3Com Corp. because of the merger.

"It's nicer to only have one vendor, and the deal might entice us to go with Madge for a complete solution," he said.■

Cheyenne

Continued from page 19

cally do anything but change a tape," Vachter said. Because the product supports the remote access service in Windows NT, Vachter can also dial in over the weekend to check a backup.

"That saves me a 20-mile trip into town," he said.

ARCserve for Windows NT 2.0 also includes a native client agent for Novell, Inc. NetWare servers that allows a Windows NT server to back up any NetWare 3.X or 4.X server.

Cheyenne soon will follow with agents for Unix, Apple, Inc. Macintosh, OS/2 and Windows 95, as well as database agents for databases from companies such as Microsoft, Sybase, Inc. and Oracle Corp., Fenton-Lee said. Cheyenne also plans to support by year-end Windows NT running on other platforms, such as the PowerPC and Digital Equipment Corp.'s Alpha processors.

Optional autochanger support for ARCserve for Windows NT will cost $595.

InocuLAN for Windows NT runs as a native, 32-bit service and checks for boot, file, stealth, multipartite and polymorphic viruses.

The software supports DOS, Windows and Macintosh clients.

The program also includes flexible licensing for both home and remote use. Cheyenne recognizes that many viruses come from workers who bring disks from home or from laptops, Fenton-Lee said. To help stem that problem, Cheyenne encourages users to install the agents on their home or laptop PC. No additional licensing is required, she said.

InocuLAN for Windows NT is available now and starts at $895 for a single Windows NT system and 50 DOS, Macintosh or Windows 3.1 clients.

©Cheyenne: (800) 243-9462.

COMMENTS?

See "How to reach us" on the Opinions pages.

NET RESULTS

The 100M bit/sec battle heats up

The battle for campus LAN dollars being waged by 100Base-T and 100VG-AnyLAN proponents has left many users scratching their head.

With more products supporting these technologies coming out this summer, it's time again to reexamine how the fast LAN options stack up.

Skip MacAskill and Melinda Le Baron

From a technical perspective, 100VG-AnyLAN offers bandwidth management and optimization features that give the technology an advantage over 100Base-T in supporting emerging desktop multimedia applications.

To achieve this advantage, however, 100VG-AnyLAN had to dump standard Ethernet's carrier-sense multiple access with collision detection scheme and embrace a new media access layer.

This prevents users from leveraging existing network management tools for standard Ethernet packets.

100VG-AnyLAN will run over Category 3 unshielded twisted-pair wiring, meaning users can implement the technology without cable upgrades. But this approach requires the use of all four pairs of wires, and all four wire pairs may or may not be available in Category 3 installations since users sometimes dedicate two of them to voice connections.

But the lack of support for token-ring frames until year-end is hindering acceptance of this technology since token-ring support represents a big advantage over 100Base-T, which only works in Ethernet environments.

Also, there are only two chipsets on the market, and without silicon, high product volumes and lower pricing will be impossible.

The technology also lacks support from two of the largest Ethernet vendors, 3Com Corp. and Bay Networks, Inc. The lack of aggressive commitment from IBM is also a factor.

On the 100Base-T side, there are more products and wider vendor support, giving users better options and flexibility. The technology also maintains Ethernet's MAC layer and CSMA/CD scheme, meaning it will act like standard Ethernet and require little net management retraining.

The technology, though, is limited to a total network diameter of 210 meters, rendering use of the technology nearly impossible for backbone nets. A related fiber specification provides for distances of up to 400 meters between hubs or switches, but even that is not a true backbone speed.

The 100Base-T technology makes most sense as a way to support a heavily accessed server since it provides shared access users with a fatter pipe.

Because it supports full-duplex capabilities, it will also be effective as a link between hubs and switches within a departmental LAN.

But 100Base-T will have limited appeal as a desktop technology initially since the introduction of a simple Ethernet switch to provide dedicated links of 10M bit/sec to individual workstations will be more cost-effective and less disruptive from an infrastructure perspective.

Both 100Base-T and 100VG-AnyLAN are immature, require changes at both the desktop and the hub or switch levels, and are virtually unproven in real-world production networks.

Also, there are currently no routing interfaces available for either technology, meaning users will not have access to the outside world until those interfaces are delivered sometime in the third quarter.

Until then, we caution against aggressive implementation of either technology.

Users should also evaluate other technologies such as LAN switching, FDDI and Asynchronous Transfer Mode, which can support the same applications at a lower cost and better scalability.

MacAskill is a senior research analyst and Le Baron a research director in Gartner Group, Inc.'s Network Computing Infrastructure group. They can be reached at (203) 967-6700.

Client/Server Applications

Covering: Databases • Messaging • Groupware
Conferencing • Imaging • Multimedia • Development

Briefs

■ **Sybase, Inc.'s** *Boulder, Colo.-based MDI* **middleware** *division is beta-testing Sybase OmniConnect 10.5, which now supports Sybase's System 10 database. Version 10.5 uses System 10's optimizer, stores metadata in the database format and supports database cursors for faster updates and deletes. OmniConnect 10.5 will ship in August, with prices starting at $2,200.*

MDI is also readying software for replicating Oracle Corp. databases. The Sybase Replication Agent for Oracle copies data from Oracle servers out to a range of non-Oracle target data sites via a Sybase Replication Server. Pricing for the Replication Agent for Oracle, which is available now for Oracle 7.0, begins at $10,000.

MDI: (303) 443-2706.

■ *Two videoconferencing companies have teamed with personal computer manufacturers to ship* **videoconferencing-ready PCs.**

PictureTel Corp.'s *PictureTel Live PCS 50 desktop videoconferencing system is being integrated with* **Zenith Data Systems Corp.'s** *Z-Station GT 575 VC.*

Meanwhile, **InVision Systems Corp.** *and* **FirePower Systems, Inc.** *have teamed to put InVision 3.1 software in FirePower's ES and MX products.*

PictureTel and Zenith's product supports H.320 videoconferencing standards; InVision and FirePower plan to add this support in September.

Zenith's PC sells for $6,895, and FirePower's costs between $3,000 and $4,500.

Zenith: (708) 808-5000; FirePower: (415) 462-3000.

■ **Wang Laboratories, Inc.** *of Lowell, Mass., last week announced Release 2.0 of its Open/image Custom Controls for* **Visual Basic,** *which lets developers add imaging capabilities to applications built with the Microsoft Corp. tool.*

Open/image Custom Controls for Visual Basic costs $195.

Wang: (508) 967-5000.

IBM client/server tools expanded for AS/400

By John Cox

IBM's reconditioned Application System/400 is ready to be a prime client/server development platform, according to industry analysts and software vendors.

IBM two weeks ago announced the release of new AS/400 computers equipped with the PowerPC Reduced Instruction Set Computing (RISC) processor to improve performance and a revamped OS/400 operating system to support more and faster connections to personal computer LANs (*NW*, June 26, page 1). Later this year, the company will release AS/400 development tools to support the next generation of distributed, object-oriented applications.

"As corporate customers put bigger and mission-critical applications out there [on the network], they should look seriously at" the new AS/400s, said Shaku Atre, president of Atre Associates, Inc., a Port Chester, N.Y., technology research company.

Attracting more business

Don Brown, chairman and research director at D.H. Brown Associates, Inc., a Port Chester technology research company, said IBM's revamped AS/400 models are designed to help IBM capture more business in Windows desktop environments. "If you're dealing with users who are not very sophisticated [technically] and you want to just plug in a computer and have it run, the AS/400 is clearly a good platform, especially in PC sites," Brown said.

Application development for the AS/400 traditionally has been for host-based, terminal applications written in third-generation languages such as IBM's RPG and COBOL, according to Aaron Tobin, AS/400 application development market manager at IBM's Toronto laboratories.

IBM is changing that by altering these older tools and introducing new ones. Last year, IBM unveiled new compilers, including one for C, and a graphical user interface for RPG, called Visual RPG (VRPG). Later this year, IBM will introduce a VRPG client for Windows PCs.

IBM also has introduced VisualGen for the AS/400, an OS/2 graphical fourth-generation language tool set that generates COBOL code for client and server platforms. IBM last year unveiled VisualAge for Smalltalk, which lets developers build OS/2-based Smalltalk applications that can access procedural code and relational data on AS/400 servers.

Later this year, IBM will release VisualAge for C++ on the AS/400.

By next June, IBM will complete the integration of its System Object Model (SOM) — an object request broker — with the OS/400 operating system, according to James Anderson, IBM program manager for object technology at the company's AS/400 division. SOMobjects for OS/400 will let the server operating system execute object-oriented client/server applications and support them with services such as data integrity and locking, which today have to be written into each application at the client level, he said. Later, distributed SOM will let objects interoperate across different operating systems.

Third-party tool vendors are enthusiastic about the changes and directions.

"They've [rebuilt the AS/400] from the ground up to support client/server," said Ron Cruickshank, midwest regional manager for Lansa USA, Inc., a Westmont, Ill., vendor of cross-platform application development tools and middleware.

One Lansa customer, a large insurance company, has a Windows application written in Visual Basic using Lansa middleware to access AS/400 data. "They're getting subsecond response from the AS/400 servers," Cruickshank said.

"IBM is bending over backward to assist their huge installed base to move from a hostcentric to a client/server view of the world," said Jeff Aliber, platform marketing manager for Progress Software Corp., a Bedford, Mass., client/server tools vendor. ■

How the new AS/400s measure up for client/server applications

New servers embrace PCs, support more development tools.

Pros:

- IBM client/server programming tool sets, tuned for AS/400, due later this year: C++ compiler, VisualAge for C++ and VisualGen.
- More third-party development tool sets available for fourth-generation language and visual programming.
- Ready-to-use class libraries will give client applications direct access to AS/400 data and services.
- Spec 1170 APIs: existing and new Unix applications run unchanged on AS/400.

Cons:

- Unclear how tightly NetWare and Notes will be integrated with AS/400.
- IBM needs to round out support for open standards such as Open Software Foundation's Distributed Computing Environment.
- Strong competition expected from Windows NT-based tools and business solutions.

Telco makes conversion to Notes

By Annmarie Timmins
Atlanta

When BellSouth Business Systems started moving users from Digital Equipment Corp.'s All-In-1 to Lotus Development Corp.'s Notes this past spring, it wanted an efficient way to convert messages stored in user mailboxes to the Notes format.

The X.400 gateway being used by the BellSouth Corp. unit to do the translation was taking too much time — as long as half an hour for some messages. So the company turned to Mailbahn, a client-based conversion utility from Woodbridge, N.J.-based Square One that has cut the average conversion time to 2 minutes per message.

Mailbahn is designed for companies that are leaving one mail system for another, not those intending to maintain two systems. The tool, which costs from $12 to $15 per user, needs to run just once at each client system.

In BellSouth Business Systems' case, Mailbahn has been deployed on Windows-based Notes clients. It asks the end user to decide which VAX-based All-In-1 messages to keep and convert into Notes, downloads them to the user's personal computer and then translates them into Notes format.

After being converted, Mail-

See Notes, *page 22*

KEYS TO THE MOVE

- Encourage users to clean up their data on the host prior to performing the conversion. This will shorten the download and conversion process as well as prevent outdated correspondence from being carried over.
- Do as much of the migration as possible during off-hours.
- Plan the migration in phases to prevent network overload and to give users a chance to get familiar with the new system.

Gupta maps apps partitioning plan for SQLWindows

By Barb Cole
Menlo Park, Calif.

Gupta Corp. is readying a spate of new software that will boost the application partitioning capabilities of its SQLWindows development tool.

The offerings include a new version of SQLWindows, plus a separate product for managing applications that have been partitioned and distributed across networks.

Users have begun turning to partitioning, which involves splitting up an application and running the components on different networked processors, to improve the performance and flexibility of client/server applications.

Gupta's upcoming Windows 95 version of SQLWindows, due about 90 days after the new Microsoft Corp. operating system ships, extends Gupta's application partitioning offerings by letting developers incorporate components built with Microsoft Visual Basic into their distributed SQLWindows applications. These components will be acces-

See Gupta, *page 22*

Gupta

Continued from page 21

sible from any front-end application that supports OLE 2.0.

Application partitioning tools typically require developers to use the same development tool to build and access software components, said Brent Williams, an analyst at Gartner Group, Inc., a market research firm in Stamford, Conn.

To help users manage application components, Gupta also plans to ship Gupta Application Server. The software will provide a platform from which developers will be able to move application components across machines using Open Software Foundation, Inc.'s Distributed Computing Environment remote procedure calls or distributed OLE, said Matt Miller, senior director of product marketing at Gupta. Also new from Gupta will be a SQLWindows add-on, dubbed SQLWindows Components Developer Kit, for building components that make up partitioned applications.

To streamline the building of these components, Gupta is readying a series of prewritten QuickObjects containing business that logic developers can knit together quickly using SQLWindows.

Customers who have already begun building application components applauded the new Gupta offerings.

The Gupta tools will be key in building so-called three-tiered applications, which run presentation code on clients, application logic on servers and databases on separate servers, said Roy Leffew, president of Grace Computer Resources, a consultancy in Atlanta. "It will also let me better leverage developers who are proficient in other tools," he said.

Pricing for Gupta Application Server and the Windows 95 version of SQLWindows was not available. SQLWindows Components Developer Kit costs $495.

©Gupta: (415) 321-9500.

Gupta deliverables

Product	Availability
SQLWindows Components Developer Kit	July
A version of SQLWindows for Windows 95	Late 1995
Gupta Application Server	First half of 1996

Notes

Continued from page 21

bahn translates the material and deposits it into a delegated Notes database.

The converted messages retain the original "postmark" information, said Robert Genco, vice president of sales and marketing with Square One. Gateways typically restamp messages as they mail them to the new system, eliminating important information, Genco said.

Scott Hertz, a manager with BellSouth Business Systems' automation group here, said that in the first month he used Mailbahn, he converted messages for a little more than half of the 3,000 users.

Although the conversion has been working well, it has not been perfect. Some of the formatting is off — tabs or paragraph marks occasionally fail to appear in complex documents, he said.

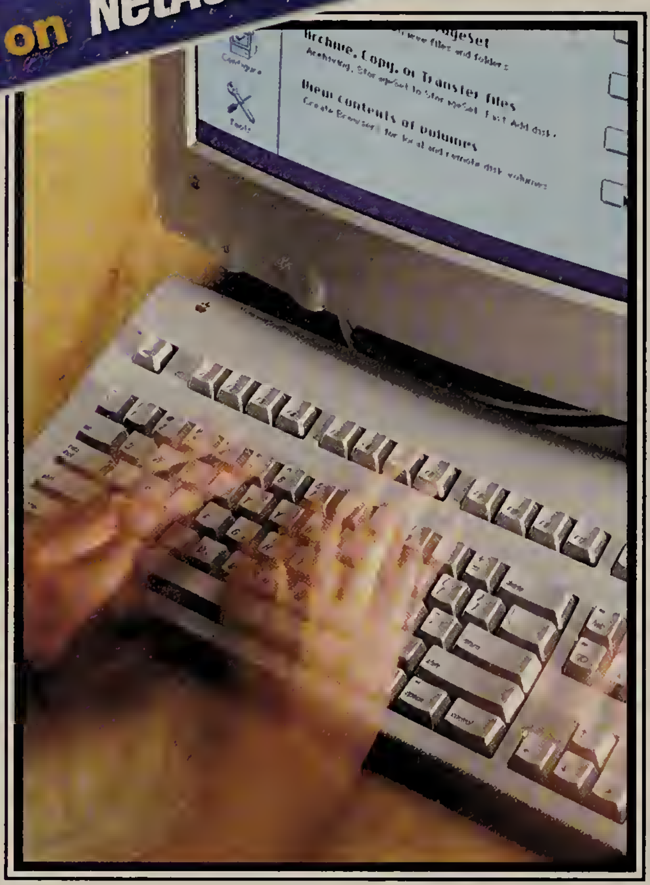
"But mailing it across [a gateway] would [cause the same problems]. Ninety percent of it made it OK," Hertz said. ■

BusinessBriefs

Bill Moroney, president of the **Electronic Messaging Association (EMA),** last week announced that he is leaving his post to run a new organization, the Multimedia Telecommunications Association. Moroney will remain president of the EMA until Labor Day; EMA directors plan to fill his spot this summer.

Client/server applications provider **Walker Interactive Systems, Inc.** of San Francisco last week named **Leonard Liu** as chairman, president and chief executive officer. Liu succeeds David Brownlee, who will remain on Walker's board of directors. Prior to joining Walker, Liu was chief operating officer of Cadence Design Systems, Inc., which sells electronic design automation software.

Enterprise Solutions, Ltd. of Westlake Village, Calif., last week announced that **Charles Schwab & Company, Inc.** has purchased about $1 million worth of its E-mail software. Enterprise Solutions' EXM Mail software will replace Schwab's E-mail systems as the brokerage firm moves about 6,000 users to a native X.400-based mail backbone.



featured this week on NetActive

New products featured in **blue**.

☐ **Abstraction Software**
Network & Workflow Modeling/ Simulation.

☐ **Baranof Software**
MailCheck Demo. A multi-vendor E-Mail management system, for monitoring all mail connections.

☐ **Bellcore**
MediaCom Software. Harness ISDN's Voice/Data Capabilities.

☐ **Communications Devices**
Network Windows Demo. Requires an MS-DOS PC with 640k and color monitor.

☐ **Dataprobe**
Annunciator Demo. Communicating Annunciator's monitor and report remote and local network alarm events.

☐ **Dynatech**
Enterprise System. Patch, switch and monitor remote data sizes. Requires Windows.

☐ **Faulkner**
CD-ROM Product Info. Describes MicroData, Communications and Dataworld Infodisks.

☐ **IBM**
OS/2 2.1 Demo. Take the "Tour of OS/2". Learn about LAN Server 3.0 and OS/2 compatible hardware and software.

☐ **Kalpana**
Ethernet Switching Interactive Demo. Increase throughput of Ethernet networks using fast packet and circuit switching technologies.

☐ **LAN Source Technologies**
WINPort. Allows Windows for workgroup users to share modems for dial-in and dial-out.

☐ **Locus Computing**
Internet Productivity Tool.

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Check out the hottest products from today's leading technology vendors with *NetActive.* Simply access the product demo library using either *Network World's* Interactive Bulletin Board System or the Windows Connectivity Forum (WINCON) on CompuServe. To connect to *NetActive* via WINCON type Go Wincon at any prompt. For more information on how to get products on *NetActive,* call Eleni Brisbois at (508) 820-7477.

For *access* to these product *demos* simply **DIAL** our **BBS** at

(508) 620-1160.
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NetworkWorld

If you'd like to participate in *NetActive,* and need an interactive product demo developed, please call Bob Zyontz at Princeton Interactive Communications, Inc., (609) 520-8575.

☐ **Microsoft**
1. Windows NT Server.
2. Windows NT Workstation.

☐ **MillenNet**
EZ-Hubview for Windows. SNMP-based network management software.

☐ **Motorola**
Wireless E-Mail. Embarc (SM) allows users to send letters, memos, database updates and more to MAC and DOS-based portable computers in over 170 cities.

☐ **National Computer Security Association**
Security Database. Computer Security Resource Database.

☐ **Network Dimensions**
GrafBASE Demo. A graphical database for managing and presenting LAN and WAN configurations.

☐ **Ornetix**
SerView Demo. Share resources, share access to CD-ROM drives and enable peer-to-peer communication with SerView.

☐ **Reference Point**
Multimedia Video, Voice & Data. Provides a complete reference for desktop-to-desktop multimedia.

☐ **Rolm**
ComManager. A computer-telephony integration PC software program that increases productivity.

☐ **Teubner & Associates**
ESP. A help desk solution that automates call logging, call tracking, solution identifying and reporting.

☐ **TRAX Softworks, Inc.**
Team Talk. A discussion application that facilitates communication among group members.

☐ **UB Networks**
NetDirector Demo. A network management system using modular architecture and powerful management applications.

Product names mentioned herein may be trademarks and/or registered trademarks of their respective companies.

NW 7/3/95

SHARED LOGIC

The update to the preview of the beta

When I joined the ranks of 400,000 Windows 95 Preview participants last March, I marveled at the fact that the number of participants in this test group alone far exceeds the long-term sales projections of most software companies.

It is astonishing that Microsoft can propose to manage a beta of this scope. I joined with little expectation of receiving much support but with great anticipation for the promised software improvements.

Windows 95 is, in fact, revolutionary software. I never bothered to ask for support because it was easy to install and ran smoothly from Day One.

The user interface is intuitive, bright and elegant. Even setting the date and time is entertaining.

Marc Myers

Everything was going along fine until Microsoft sent me the update to the preview of the beta.

Like most users, I don't like to fix things unless they are broken. Although I've read and heard about Microsoft's problems with the 32-bit multitasking aspect of Windows 95, it runs all my 16-bit stuff flawlessly.

What made me even happier was that the software my firm has been developing for the past year to run in the Windows environment ported to Windows 95 without a hitch.

Then came the June 20 Airborne package from Microsoft containing a one-page cover letter addressed to "Windows Preview Program participant," a license agreement and a white, unmarked cardboard CD case.

The cover letter said that the update contained many improvements based on the enormous amount of feedback provided by preview participants. I wondered what my 399,999 colleagues had found wrong with the program that actually compelled Microsoft to send out 400,000 new copies of free software.

So I dropped in the CD and started the install. To make a long story short, after about 10 minutes of "routine" procedures, the setup program finally informed me that it didn't have enough disk space.

So I dutifully freed up 20M bytes of space and tried again. This time it worked like a charm, though it only used up 10M bytes of free space.

This raised a dilemma: The update to the preview of the beta was 10M bytes bigger than the preview of the beta.

What did Microsoft do in only three months that led to 10M bytes of additional new material?

I logged on to CompuServe to see what some of my 399,999 peers had to say about it.

The only hitch was that when I tried to get into the WIN95PRE forum, I was asked why I wanted to join the forum. This was a new wrinkle, but I figured I'd tell the truth, so I answered, "Because I am a Windows 95 Preview Program participant."

The system replied, "Thank you. Your membership request is being considered, and you'll be notified in CompuServe mail regarding the status."

Don't call us, we'll call you.

I haven't heard back from Microsoft yet, but it's only been a little more than 24 hours since I sent my request. I should have known better — there might be hundreds of thousands of people in front of me in line.

Still I admire Microsoft's audacity: 400,000 upgrade CDs, just to show us some cool new features prior to the August release. That took some chutzpah.

What's more, the software is actually good.

Though it's my job to fuss over the details, this operating system's interface presents the most intuitive and usable graphical interface I have had the pleasure to utilize. Windows 95 will be a winner, but the upgrade to the preview of the beta was, for me, unnecessary.

Myers is president of Client/Server Connection, Ltd., a Cambridge, Mass., firm that specializes in client/server software solutions. He can be reached at (800) 622-1108, Ext. 522, or via CompuServe at 71332,1726. Myers' column alternates in this space with that of META Group, Inc.'s Mike Rothman.

NetworkWorld readers

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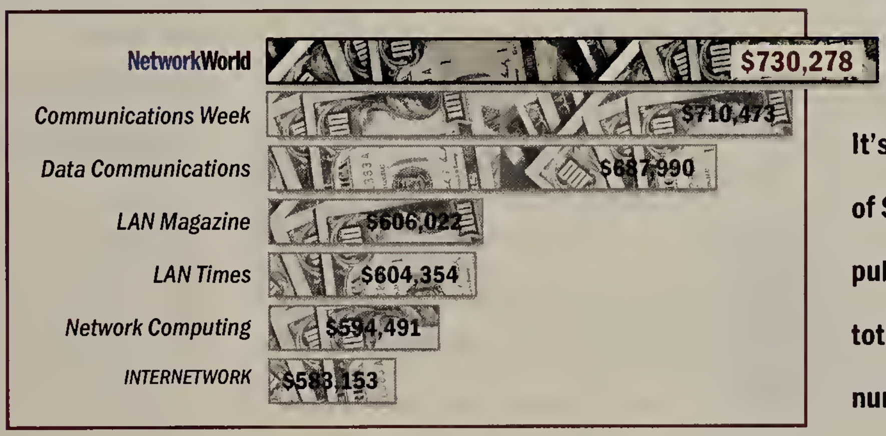

Network/LAN Publications Ranked by Average Total Spending in the Last 12 Months

Source: Simmons CompPro III, 1995

It's been confirmed yet again — this time by the results of Simmons CompPro III. Among all network and LAN publications, *Network World* ranks #1 on average for total spending, network spending, PC spending and number of PCs acquired in the last 12 months.

Our readers not only outspent readers of other network and LAN publications — they also spent MORE on their networks in the last 12 months than readers of any of the other 47 publications and newspapers studied!

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NetworkWorld An IDG Compa

Database vendors taking alternate routes to support parallel processing

Informix considered early leader, but Oracle, Sybase and IBM are coming on strong.

By Barb Cole

The major database vendors are waging war over which company's software best supports parallel processing hardware, and it's hard to tell who will wind up on top.

Informix Software, Inc. is considered by many to be the early leader because it can process essentially any database task in parallel and performs well on symmetric multiprocessing (SMP) computers. But others, such as Oracle Corp. and IBM, are coming on strong by boosting the parallel capabilities of their servers on a range of hardware platforms.

The battle is far from over, analysts said, because all the vendors still have plenty of work to do in the areas of processing complex SQL queries in parallel and offering improved application scalability. In addition, users are looking for better management tools.

Parallel databases split up their work among multiple processors, resulting in fast performance and the ability to handle large databases and workloads. SMP systems — which process work over several CPUs on the same computer — are more common today than massively parallel processing (MPP) systems, which break up work among processors on different computers.

How they stack up

Gambling that parallel processing would take off, Informix several years back redesigned its database to take advantage of parallel processing hardware and rolled out is first parallel offering last year in OnLine 7.1.

So far, the gamble has paid off for the No. 3 database company, which has landed several sizable deals as a result of its parallel database technology and won accolades from industry watchers for it.

"I don't normally pick a winner, but I feel confident in saying that Informix is ahead here," said Judy Davis, an analyst at Patricia Seybold Group, Inc., a market research firm in Boston.

When the company ships OnLine Dynamic Server 8.0 later this year, Informix will round out its parallel database offerings by adding support for MPP systems, she said.

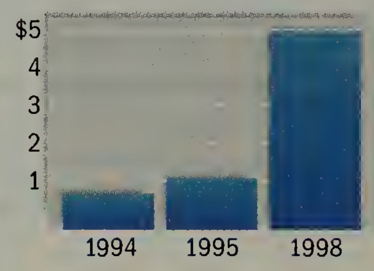
Informix is also expected to lead the pack in its support of parallel database clustering, which allows one processor to work on one piece of information while another takes on a different task.

Informix's OnLine employs a shared-memory architecture, in which the processors share memory and disk storage. The payback of this design is the relative ease of setup and stellar performance on SMP platforms.

Dan Amedro, vice president of Regency Systems Solutions, the information systems division of Hyatt Hotels Corp. in Oakbrook Terrace, Ill., said his parallel Informix database was relatively painless to configure and is strong on building indexing in parallel.

THE PARALLEL PROCESSING PAYOFF

Projected worldwide growth of parallel processing market
(including hardware and software)



Figures are in billions of dollars.

SOURCE: GARTNER GROUP, STAMFORD, CONN.
GRAPHIC BY TERRI MITCHELL

"We've also seen significant performance gains when doing ad hoc queries," said Amedro, who is running OnLine as part of a reservation system.

Having been one-upped by Informix, Oracle is hard at work boosting the parallel capabilities of its flagship database.

Oracle Parallel Query Option — part of Oracle7 Release 7.1 — supports SMP, MPP and clusters, but does not parallelize complex queries as efficiently as OnLine.

Oracle recently rolled out Release 7.2, which is up to 10 times faster than the previous version on complex queries that require the database to scan tables, according to Steve Faris, senior director of server technology at Oracle.

Another new feature that improves the speed of large database applications is the server's ability to write data in parallel.

Linda Bronson, manager of information management and architecture at Mervyns, a division of Dayton Hudson Corp., said Oracle's parallel features are most evident when doing batch loads of data and full table scans. "It doesn't really help on [scanning] indexes," she said.

Perhaps no other database vendor can better attest to the importance of parallel support than Sybase, Inc. The firm has been battered in the market for its lack of scalability, a reputation it largely gained through its software's poor performance on SMP systems.

Sybase is the most scattered in its parallel implementation, Davis said.

"They have IQ Accelerator for fast queries, but it's not parallel," she said. "Then there's the Navigation Server [add-on] for MPP and the as-yet unreleased SQL Server 11 for SMP."

SQL Server 11 is expected in the fall, but analysts do not foresee a shared-memory implementation until next year.

On the plus side, Sybase is ahead of its competitors in providing good management tools for configuring Navigation Server.

The Chase Manhattan Bank, N.A. in New York uses Navigation Server as part of a decision support application for tracking credit card customer information. The application spans 128 processors across multiple AT&T Global Information Solutions servers and utilizes some 640G bytes of disk space. As it grows, though, "we simply add another processor and more storage," said Jane Landon, systems vice president of advanced technologies.

Sybase's Configurator management tool greatly eases the daunting task of setting up a parallel database, she said.

While Sybase is largely playing catch-up in the parallel database arena, so is IBM. It is beta-testing a parallel edition of DB2 that is expected to ship by year-end based on the shared-nothing architecture, in which the database parallelizes an SQL statement across multiple nodes that each has its own memory and disk.

Its parallel support will be built into the core database and is likely to be quite scalable, Davis said. However, that offering is anticipated to run initially only on IBM hardware and lag in its optimization on SMP machines and clusters.

Architectures aside, with a relatively immature crop of parallel databases to choose from, the only way to ensure the right fit is real-world testing, early adopters said.

Architecture isn't always indicative of how parallel databases perform in the real world, said Ken Rudin, managing director for Emergent Technologies, Inc., a Redwood Shores, Calif., consultancy specializing in parallel database systems. ■

DOING IT IN PARALLEL

Database	Parallel support
IBM DB2 Parallel Edition	Expected to ship in the third quarter, this database wil run on IBM's SP2 hardware, and do updates and queries in parallel.
Informix OnLine Dynamic Server	Can load data, build indexes, process queries and replicate data in parallel on SMP machines. Will add support for large-scale MPP machines in OnLine Dynamic Server 8, due later this year.
Oracle7	Can load data, build indexes, process queries, replicate data and do backup in parallel on SMP machines.
Sybase SQL Server System 10	No inherent support for SMP machines, but the company plans to add this during the next year as part of its System 11 release. A SQL Server add-on called Navigation Server lets users run Sybase databases on MPP hardware from AT&T GIS.

Parallel database mgmt. is demanding

Parallel databases present a special set of management challenges, some related to the parallel architecture and some simply having to do with the size of the database.

Richard Finkelstein, president of Chicago consultancy Performance Computing, Inc., has identified five major traits of parallel databases that can make a corporate MIS group's work more complex:

■ Moving data — Loading server-based parallel databases from mainframe or legacy data stores requires an array of tools. The tools let users select the source data, move it efficiently over the network and load it into a parallel database. Related issues include the ease with which parallel databases can be updated or refreshed.

■ Storing data — Large databases require lots of disk storage and that means Redundant Arrays of Inexpensive Disks (RAID), which use different techniques to store, protect and access data on low-cost disk drives.

■ Data partitioning — Assigning data to particular parallel database processors or nodes can be critical to achieve optimal performance. "You can get hot spots, where a single database or part of a database is very heavily used," Finkelstein said. With DB2 Parallel Edition running on the RISC System/6000 Scalable Processor, for example, IBM will offer a pair of tools to detect hot spots and repartition the parallel database. Some tools limit administrators to partitioning tables; others partition at the column or row level.

■ Query optimization — Optimizing queries to create the best path to the needed data is tricky with parallel databases. Typically, relational databases rely on statistical information about the stored data to optimize the query.

"In order to get that information, you have to run utilities that scan the whole database: Keeping these statistics updated can be a chore [in a parallel database]," Finkelstein said. Users should ask how queries can be optimized, what utilities are available and how they perform as the size of the database increases.

■ Operations — Look for tools that automate standard database administrative tasks. "You need a degree of [operational] automation that you didn't need before," he said.

By John Cox

Electronic Commerce

Covering: Tools and Techniques for Interenterprise Networking
and Doing Business On-Line

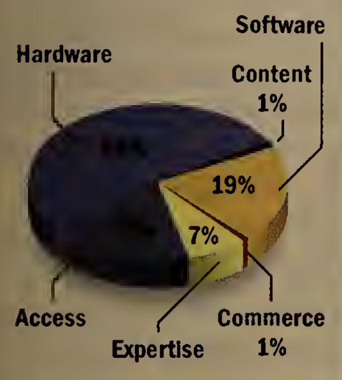
Briefs

■ **The Bay Area Regional Governments,** *an association of city and county agencies in the San Francisco area, has begun posting local government contracts up for bid on its World-Wide Web site at http://www.abag.ca.gov.*

■ *Newton, Mass.-based consultancy* **The Business Research Group,** *last week issued a report on the Internet commercial market that puts total market revenue at $854 million in 1994; it is expected to exceed $4 billion in 1997.*

1994 COMMERCIAL INTERNET REVENUE

Total: $854 million



THE BUSINESS RESEARCH GROUP, NEWTON, MASS.

■ *The video dial-tone revolution remains at least four years in the future, said* **EDS Management Consulting Services** *located in Cambridge, Mass.*

Joseph Schatz, EDS director of telecommunications technology consulting, said a review of 40 telephone and cable operator video-on-demand trials showed that a lack of standards in infrastructure equipment is contributing to high costs, while performance in video storage systems remains unreliable.

■ **Accent Software International, Ltd.** *in Exton, Pa., announced that this fall it will ship both a multilingual World-Wide Web browser that can view Web content in more than 35 languages and its Hypertext Multi-Lingual Markup Language software that can create Web pages in non-Latin alphabets.*

Accent Software International: (800) 535-5256.

Microsoft widens its E-com platform

By Ellen Messmer

Redmond, Wash.

Set to launch next month, The Microsoft Network (MSN) will knit together EDI networks, the Internet and hundreds of content providers across the world in a fashion unknown under existing on-line services.

MSN is building a bridge to the GE Information Services (GEIS) electronic data interchange network, something no on-line service has done before, and has rounded up a host of business and legal information providers to deliver content to future subscribers.

Microsoft's marketing strategy is to bundle the access software for MSN into the upcoming Windows 95 to make it simple for new Windows 95 users to dial in to MSN and subscribe on-line to the hundreds of available electronic commerce services.

What's more, small businesses will be able to send EDI purchase orders and invoices through MSN to the GEIS EDI network, said Anne Biehl, GEIS program manager. The MSN subscriber will be able to view a list of GEIS EDI trading partners, register electronically to share EDI traffic, and download the invoice and purchase order software to get started.

Internet access

MSN subscribers will have access to the Internet in August. The goal is to let anyone reach the MSN service through the Internet by year-end, as well, said Bill Miller, MSN director of marketing. Competing services America Online, Inc. and CompuServe, Inc. offer outbound connectivity to the Internet but do not provide access to their services via the Internet.

While MSN was originally designed based on proprietary protocols over X.25, it will become mostly a TCP/IP net by year-end, Miller said. TCP/IP already plays the role of a translation protocol between disparate GEIS and MSN nets. Microsoft plans to have a World-Wide Web search service that will retrieve the type of data requested by MSN subscribers.

But the Department of Justice is suspicious that Microsoft may be competing unfairly in on-line services. In the past two weeks, it has subpoenaed Microsoft as well as dozens of service, software and hardware providers — many without clear ties to MSN — to glean data about contractual relationships and pricing.

In what appears to be a rush to gather information to build a case against Microsoft, the Justice Department frequently gave firms only two days to respond to extensive requests for data.

Atlanta-based Pipeline Communications, Inc., an electronic registration service for computer products, was one firm hit with a subpoena, although it has no involvement with MSN.

The Justice Department asked Pipeline to disclose what percentage of on-line registrants took Pipeline up on its offer of 10 free hours of America Online service time as a gratuity for registering products electronically. To give the answer — which is 60% — Pipeline had to race to get permission to release this proprietary information from its vendor clients. The department may want this data to determine the market impact of similar offers Microsoft may make.

In all, the recent subpoena blitz of the industry raises the prospect that the launch of MSN could be slowed if the Justice Department files suit to force Microsoft to remove the MSN access software from Windows 95 before August. ■

Microsoft allies

Sampling of new business services going on-line with The Microsoft Network this August:

- **GE Information Services' EDI network**
- **American Management Association's WorkSmart business guidance**
- **PhotoDisc, Inc.'s CD-ROM Image File Library**
- **The Law Office, Inc.'s legal documents and advice**
- **CNBC's interactive financial news and information**
- **Palcor Hospitality Corp.'s INNterREST for the food and lodging industries**
- **Patriot Services, Inc.'s Computerized Loan Origination System**

SOURCE: MICROSOFT CORP., REDMONO, WASH.

BUSINESS SPACE

Wide-area what? Or kickin' virtual butt

Soon WAN isn't going to mean wide-area network; it will stand for wide-area Nintendo.

It has to happen. In fact, AT&T has already taken a shot at wide-area games (WAG?) with the Imagination Network.

But just like all on-line services, the inherent constraints and limitations of such a controlled environment don't lead to the kind of market emerging on the Internet.

Actually, when you think about it, it is curious that Nintendo, Sega, et al haven't made multiplayer games the focus of their marketing, rather than the experiments they're undertaking. I mean, here we have the most widely available and aggressively marketed games platforms in history, and their major focus is to pit you against the computer.

Mark Gibbs

Indeed, if you visit one of those meccas of pimpled youth, the games arcade, you'll see that interpersonal competitiveness and not meat-versus-silicon is what the games are all about.

In the arcade, the contenders are mostly male, but that's not surprising; this kind of competition is rooted in testosterone. When the guys want to spar, they go to the arcade, march up to whatever game is hot and plunk down their quarters.

The contenders and the wanna-bes all watch while each combatant shows just how much virtual butt he can kick.

But on-line, the competitive arena could be hundreds of thousands of people instead of, at best, 10 or 20. And victory would become a matter of global, rather than local, excellence.

Wide-area gaming is strong on the 'Net, but it lacks commercial gloss and sophistication.

The first commercial game I'm aware of that will work across the Internet will be CivNet from MicroProse Software. This game is the direct descendant of a game called Civilization.

In Civilization, you attempt to manage the growth of...guess what? We're talking pyramids to skyscrapers here. You and up to seven other budding megalomaniacs try to build the most advanced civilization you can using trade and war.

In the Internet version (initially, Windows only), you'll be able to send messages to other players so you can wheel, deal and conspire. MicroProse tells me it is still figuring out some of the details, such as how players will find each other to set up games, but the firm is planning a launch this month.

This is only a glimmer of what will grow into an extraordinary market. In short order we'll see commercial, graphically oriented, multimedia multiplayer 'Net games that will be played through central server systems. Single-player and team games will exist, and competitions involving tens of thousands of people will occur. Games will also appear on the Web. Sega and Nintendo will come out with low-cost, high-performance games terminals and virtual reality headgear, gloves and other equipment will become de rigueur for the serious player.

Microtransactions (tens of cents) will become the charging mechanism and, eventually, huge cash prizes will be awarded. Spectators will watch the games, and broadcasts could become big business. The future of on-line games is going to be low cost, high volume, global and compelling. It will make a lot of games and service vendors very rich.

And perhaps I'll finally find a computer game I like. But I doubt I'll be any good at it.

Gibbs is a consultant and author who stopped learning new games when Scrabble was invented. Send your commiserations via the Internet at mgibbs@gibbs.com or call (800) 622-1108, Ext. 504.

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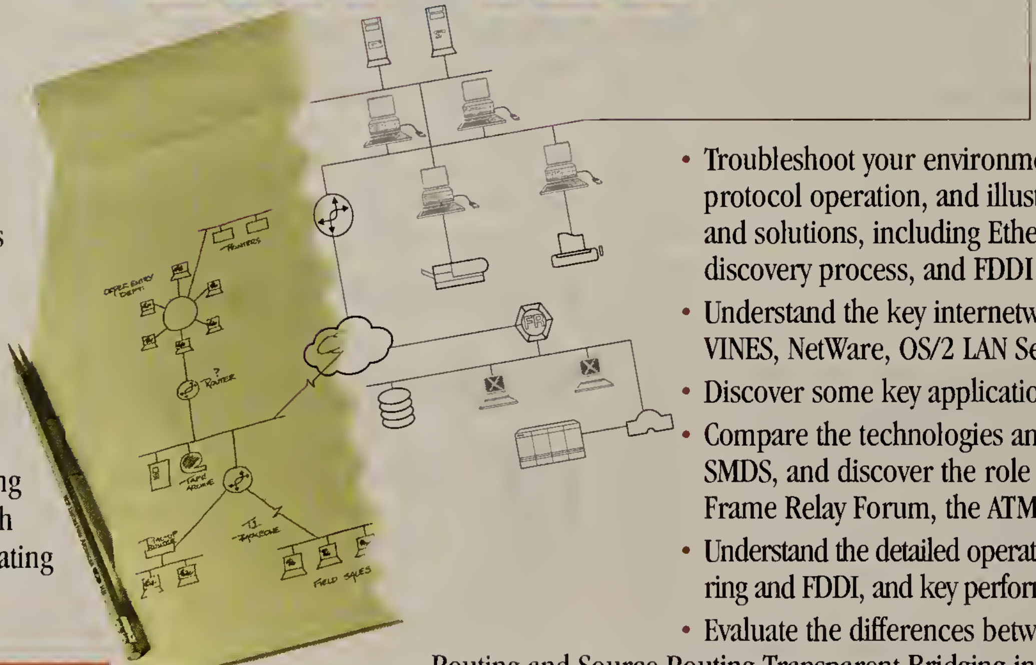

The ever-changing internetworking landscape, fueled by emerging broadband technologies, dramatically challenges traditional LAN and WAN architectures. Network professionals must now integrate local and wide-area networks with new technologies including fast Ethernet, ATM, frame relay and SMDS. These and other new technologies hold the promise of more efficient and ever-faster communications across enterprise networks.

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- Discover some key applications for narrowband ISDN technology
- Compare the technologies and operation of ATM, frame relay and SMDS, and discover the role of the broadband implementers: the Frame Relay Forum, the ATM Forum and the SMDS Interest Group
- Understand the detailed operation of Ethernet, IEEE 802.3, token ring and FDDI, and key performance characteristics of these technologies
- Evaluate the differences between Transparent Bridging, Source Routing and Source Routing Transparent Bridging internetworking standards
- Utilize available software tools in the network optimization and modeling process
- Examine application gateways that connect LANs, minicomputers and legacy systems
- See how SNMP plays a key role in internetwork management including the management and operation of broadband networks
- Understand the operation of IP-based routing
- Match the appropriate LAN application with the WAN broadband technology
- Understand TCP/IP and the Internet protocol suite, including ARP, ICMP, UDP, SMTP, TELNET and FTP
- Explore the internetworking challenges of remote access and wireless communications

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Chicago, IL	November 28–29	**Orlando, FL**	March 14–15
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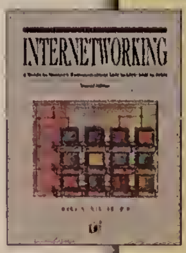

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I'm writing a corporate policies manual that covers the use of the Internet and electronic mail, as well as integrated technologies such as fax and wireless communications. Where can I find information about what to cover on these topics?

Dan Biell, Denver

You can begin with a copy of the Electronic Messaging Association's (EMA) white paper "Access to and Use and Disclosure of Electronic Mail on Company Computer Systems: A Tool Kit for Formulating Your Company's Policy," by David Johnson and John Podesta. The document costs $20 for EMA members and $45 for nonmembers. For more information, call the EMA at (703) 524-5550 or send E-mail to info@ema.org.

Also, check out *New Riders Guide to E-mail and Messaging* by Larry Morris (New Riders Publishing, 1994). This book covers a variety of E-mail topics, including guidelines for using technologies such as fax, paging, telephone and multimedia with E-mail. The book costs $35. To order a copy, call New Riders Publishing at (317) 581-3500.

For some net etiquette advice, pick up *Netiquette* by Virginia Shea (Albion Books, 1994). Some helpful sections cover electronic style and the core rules of the on-line world. The book costs $19.95 and can be ordered from Albion Books by calling (415) 752-7666.

The Internet is also a good source for net etiquette advice. Point your Web browser at http://rs6000.adm.fau.edu/rinaldi/net/index.htm and check out "The Net: User Guidelines and Netiquette."

For a case history about what to expect when preparing your manual, read "Horses and Barn Doors: Evolution of Corporate Guidelines for Internet Usage" by Sally Hambridge and Jeffrey Sedayao, both of Intel Corp. This paper was originally published in the USENIX Proceedings of the Seventh System Administration Conference in November 1993. To access the document, point your Web browser at http://www.intel.com/intel/papers/horses.html.

See **Help desk,** *page 33*

WinSock specs marry Windows applications to network stacks

By Martin Hall

If you bought a VCR, took it home and found that the plug didn't fit your electrical socket, you'd get frustrated and complain about wasted time and money.

For a long while, this scenario was typical in the Windows communications world. Customers buying net-enabled applications had to carefully check to ensure that the plug on their applications fit their net software socket. Fortunately, a standard plug for net applications is emerging in the form of Windows Sockets.

The specification was put together by an ad hoc vendor standards group. In 1991, 30 software vendors joined to create a standardized plug-and-socket definition for Microsoft Corp. Windows-based net applications.

WinSock Version 1.1 open network standard was published in January 1992. Its focus was the definition of a common way for Windows applications to interface to TCP/IP stacks. This standard network programming interface on all versions of Windows has enabled software vendors to create applications with a standard plug. The WinSock interface standard has created an explosion of TCP/IP and Internet-capable software for Windows and helped fuel the Internet phenomenon.

WinSock 1.1

The WinSock 1.1 specification defined a Berkeley Sockets (BSD) 4.3 API for TCP/IP.

Like BSD, WinSock provides APIs to resolve addresses and services differences. It also provides a set of asynchronous extensions that allow applications to send and receive message-based notices about net events, such as the arrival of new data. With these extensions, vendors have developed more natural and better behaved Windows-based communications applications.

Currently, TCP/IP-capable software for Windows almost always uses the WinSock interface. Network protocol vendors providing a WinSock interface include Novell, Inc., Walker Richer & Quinn, Inc., FTP Software, Inc., Netcom Online Communications Services, Inc., SunSoft, Inc., Beame & Whiteside Software, Inc., The Wollongong Group, Inc., Distinct Corp. and NetManage, Inc.

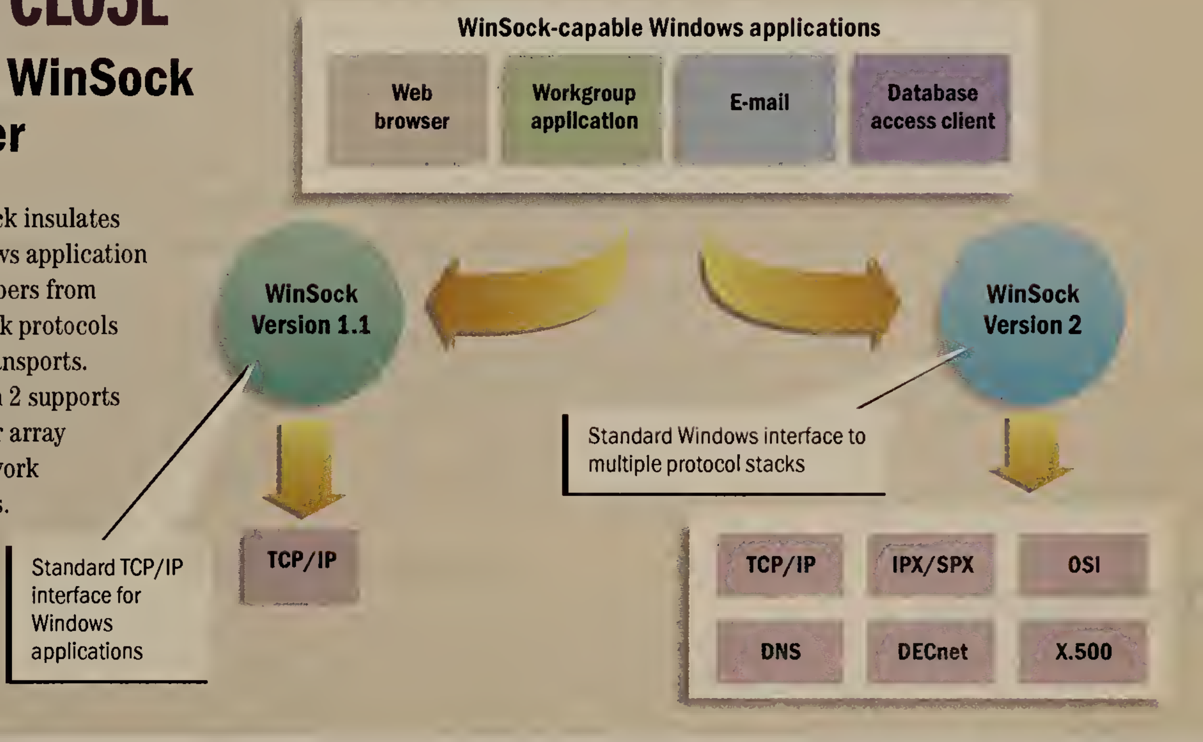
To make an application compatible with WinSock, a developer must use the API calls defined in the WinSock specification and test the software on different WinSock implementations.

Other uses of WinSock are emerging. On-line and dial-up software vendors have recognized a need to support WinSock. Vendors such as Netcom, CompuServe, Inc., Quarterdeck Office Systems, Inc. and Network TeleSystems, Inc. have created WinSock implementations that let WinSock applications work over modem-based connections. Now mobile executives and telecommuters can use familiar software over dial-up connections.

UP CLOSE

The WinSock layer

WinSock insulates Windows application developers from network protocols and transports. Version 2 supports a wider array of network options.


WinSock-capable Windows applications
Web browser
Workgroup application
E-mail
Database access client
WinSock Version 1.1
WinSock Version 2
Standard TCP/IP interface for Windows applications
Standard Windows interface to multiple protocol stacks
TCP/IP
TCP/IP
IPX/SPX
OSI
DNS
DECnet
X.500

Another new category of WinSock implementations making an impact are proxy implementations. Although WinSock 1.1 applications cannot work natively over NetWare LANs, vendors such as Firefox, Inc. have created WinSock implementations that redirect WinSock application requests over a Novell NetWare LAN to a TCP/IP net stack that resides on one or many NetWare servers.

WinSock Version 2

The WinSock Group — which now includes several hundred developers and corporate technologists — has for the past 12 months been defining WinSock Version 2. WinSock 2 extends the specification to additional network transports such as IPX/SPX, and to additional transport media, such as Asynchronous Transfer Mode, ISDN and wireless connections.

The new version includes enhancements in several areas. Application developers wanted improved performance and generalized name resolution services, which would allow them to perform network service identification requests through a common interface.

Protocol vendors were interested in running more applications over their network stacks. In addition, companies working on new transport technologies — such as wireless communications and telephony-based solutions — wanted WinSock to support these media and include features such as multimedia-enabling Quality of Service.

To support this new functionality, the architecture of WinSock changed. A single master WinSock 2 Dynamic Link Library provides a common entry point to the WinSock 2 subsystem. Links to different network transports as well as name and service resolution mechanisms are provided via service providers, which translate any underlying differences.

Microsoft was a founding member of The WinSock Group. Windows NT has included 16- and 32-bit WinSock capabilities since its first version, as will Windows 95. Microsoft has made the next version of WinSock a strategic component of its Windows arsenal.

The provisional WinSock 2 spec is now available. The final version of the specification will be made available following interoperability testing. Comprehensive information about WinSock can be retrieved from http://www.stardust.com.

Engineers have already started to work on exploiting this interface. WinSock 2-capable applications, net stacks, and name and directory services will start to appear early next year.

Companies will benefit from this in many ways. The number of software packages available to network managers will increase, and the amount of time, money and frustration spent determining what package plugs into what socket will decrease.

Hall is chief technology officer and founder of Stardust Technologies, Inc., a Campbell, Calif., firm that specializes in WinSock testing and consulting. He is chairman of the Windows Sockets Group and can be reached at (408) 879-8080 or martinh@stardust.com.

EDITORIAL INSIGHTS

The numbers game

It's time for telephone industry leaders to lift their heads out of their usage reports and start educating the public about what's going on with the nation's telephone numbers. If not, users' cries of pain will be heard from coast to coast.

The FCC's emergency move last month to ration the small remaining supply of 800 numbers was the inevitable result of the industry's delay and denial. For months, industry officials kept staring at their 800-assignment reports, assuming that the trend to snatch up 800 numbers would somehow stop accelerating. Instead, it gained speed (see story, page 13).

The urgent need now is a campaign to inform the public about the new 888 toll-free area code. The code was originally due to take effect next April, but a red alert has gone out to central office switch makers to try to push up that date.

Users are deathly afraid that the public will not understand or trust 888, given the now-total association of 800 with toll-free calling. That very fear, along with uncertainty about who gets first crack at 888 vanity numbers, has contributed to the 800 panic grab.

It's going to take ads in the mass media to cut through the blizzard of information thrown daily on an inattentive public. Even for ordinary telephone numbers with unusual new area codes, users and state regulators are demanding that the RBOCs conduct a national ad campaign — and that's just a question of educating PBX administrators to upgrade their software.

But let's be clear about who needs to take financial responsibility in the 888 education process. It may be the RBOC-owned Bellcore that assigns 800 numbers, but the lion's share of the 800 gold rush has gone to the Big Three long-distance carriers.

There's even a clear way for AT&T, MCI and Sprint to advertise the change in a way that will make Madison Avenue happy. They can congratulate the American consumer for the explosive success of 800 calling, then explain how a call to an 888 number achieves exactly the same purpose.

Carriers and users alike should take a vital interest in the coming FCC rule making on the 800 shortage and the assignment of 888 numbers. The issues present a striking parallel to the shortage of Internet Protocol addresses. In both cases, a free, semipublic resource attained enormous commercial cachet, causing a run and creating fights over similar-sounding monikers.

Don't be alarmed if the FCC repeats a proposal from earlier this year to gain the right to auction telephone numbers considered to have special value. In the end, it may be the best and fairest way to allocate a vital resource and avoid abuse.

David Rohde drohde@world.std.com

Teletoons

By Phil Frank and Joe Troise

Me? A burglar? You insult me, madam... I am, in fact, an innovative 3-D interactive application from the Internet delivering late-night tech support!
Phil Frank

SPEAKING THE LANGUAGE

Some lessons in net disaster recovery planning — learned the hard way

Linda Musthaler

There's a saying that lightning doesn't strike the same place twice, but I'm here to dispel that claim. My firm, Currid & Co., is a technology consultancy that just took two direct hits, and I hope you can learn from our experiences.

Our first hit happened in mid-January, when thieves broke into our office building and stole more than $60,000 worth of our network equipment. To add insult to injury, the same group is suspected in our most recent break-in, in which another $15,000 worth of equipment was literally carried out the window.

Despite the interruption to our work, we consider ourselves lucky, for the situation could have been much worse. At least we were somewhat prepared for these disasters and could recover without tragic loss of business. Unfortunately, many network managers could not say the same thing if a disaster was to strike their company.

Since you never can tell what kind of disaster might befall your net, it's better to plan for the results of the disaster, rather than for the actual cause. For instance, instead of trying to think of every contingency in the event of a fire, think about what you would do if you lost the service of a primary server and you could not enter your office for a day.

> *At least we were somewhat prepared for these disasters and could recover without tragic loss of business. Unfortunately, many net managers could not say the same thing if a disaster was to strike their company.*

Our recent burglaries opened our eyes to the holes in our disaster recovery plan and taught us a few lessons. Fortunately for us, the lessons were more a slap on the wrist than a blow to the heart — our business survived. Here are a few of the lessons we learned the hard way.

First, it's crucial to have good data and network directory backups. While it's most important to back up servers, be sure you also include strategic desktop units in your backup plan.

These days it's easy to back up a PC's hard disk to a network drive. Including PCs in your regular backup plan can save you from having to spend a lot of time reinstalling and reconfiguring desktop software should a disaster occur. Test your backup plan every once in a while by doing a restore — not just of one or two files, but of whole directories and user profiles.

My firm did, in fact, have data and net directory backups, which is what saved us. However, we had to use an older backup than desired because the most recent backup was unusable: Our backup software failed us by not placing an end-of-file marker on the tape, making it impossible to fully restore everything we needed. As a result, we lost a few days' worth of work, which is a nuisance for a small company. For a large company, it can be truly traumatic.

Second, keep good records — of your insurance, network configuration, equipment inventory and so forth.

Because our disaster involved a crime, we were required to provide detailed equipment information, such as serial numbers and replacement values, to the police and insurance company. Yes, sir, we had all that information. The problem was, the information was on a spreadsheet on the network, which was down because of the stolen equipment. Our paper records were less up-to-date, but a lifesaver nonetheless.

Moral: If you keep equipment records on the network, make sure you also keep an up-to-date, printed copy of them stored in a safe place.

Third, know who can help you get back on your feet — including internal support personnel, vendors, suppliers and disaster recovery contractors. Have a ready source for replacement equipment, office space and the like.

Our network was down for less than two days because we were able to tap the resources of suppliers that provided us with replacement equipment quickly. Fortunately, except for a few broken windows, our facilities weren't damaged.

Fourth, have a contingency plan for continuing business. Telecommuting can be a boon here.

Several of our consultants continued working as if nothing had happened because of our liberal telecommuting policy. They already had virtual offices set up in their homes, so they suffered little. In fact, these employees had much of their data replicated on their home systems, so they were able to help restore the network when the time came.

I have one caution about data replication for remote users, however. In our case, we restored our electronic mail post office to the state it was in three days before the break-in. This meant some data was lost. One remote user, unaware of the jump back in time, dialed in and synchronized his mailbox to the E-mail server. Unfortunately, his remote unit was more up-to-date than the server, and he actually overwrote some recent mail. In the future, we would temporarily disable remote access until all users understood the status of the data.

Fifth, physically secure your net components. This was, perhaps, the weakest part of our original disaster plan. We failed to anticipate that someone could steal our equipment by coming in through the window rather than by the front door. A few well-placed motion detectors and an alarm system installed after the first burglary lessened the impact of the second break-in.

In addition, we moved all vital equipment to an internal office and installed a dead bolt on the door. By the time lightning struck us the second time, the thieves got only a desktop unit and printer before they were detected and ran out of time.

Disaster recovery planning is the last activity everyone wants to think about, and it's the rare company that devotes sufficient time and money to the effort. But having a plan will help keep you from being caught short after a disaster happens, struggling to get your network — and your business — up and running again.

Musthaler is vice president of research at Currid & Co., a Houston-based technology consulting firm. She can be reached at (713) 789-5995 or via the Internet at musthaler@ngwgate.mhs.compuserve.com.

NETWORK MANAGEMENT

Spectrum Test Drive revs up SNMP platform competition

John McConnell

Like the little boy who pointed out the emperor's nakedness to a disbelieving crowd, Cabletron Systems, Inc. is using its Spectrum Test Drive program to show users the weaknesses of the leading SNMP platforms (*NW,* June 19, page 1).

Cabletron's move can only be welcomed by users that continue to indicate low levels of satisfaction with current management products. In the 1995 "Network Management Satisfaction Survey" my firm conducted in collaboration with *Network World* (*NW,* May 8, page 51), users of SNMP platforms rated their overall satisfaction levels as lying between "somewhat satisfactory" and "only adequate." This is disappointing considering the amount of time and money vendors have invested in producing their SNMP platforms and the time and money users have invested in implementing them.

Cabletron's Spectrum Test Drive allows users of HP's OpenView and SunSoft's SunNet Manager to make head-to-head comparisons between their current platforms and Spectrum. An 18-wheeler on which OpenView and SunNet Manager will run will be available at the test-drive site. (Interestingly, there will be no Cabletron gear being managed in the truck.) Cabletron will provide test-drivers with free training and Spectrum software (one copy of the SpectroServer distributed database software and one copy of the SpectroGraph graphical user interface), as well as the appropriate management application modules; users must provide the workstation on which to run the product.

The test-drive lasts for 30 days, at the end of which users have the option to continue using Spectrum if they sign an agreement stating that they will no longer use their former SNMP platform. Cabletron sweetens the pot by offering a 50% discount on further training for six months to those who make the change. Current Spectrum users also benefit by receiving the same discount for management applications and tool kits.

Cabletron's approach is a refreshing change from the ongoing platform battles waged with press releases and announcements about future directions. Until now, there have been no realistic ways of assessing the relative strengths of management platforms. Clearly, Cabletron expects to win a good portion of these test-drives. The company has a lot of confidence in its technology and in its network management vision.

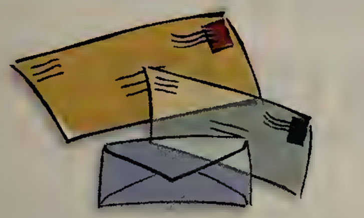
> *"The Spectrum Test Drive is an opportunity for net managers to evaluate an alternative management platform in the only test environment that really matters — their own networks."*

When Spectrum was initially introduced, it received little respect from most industry analysts and the trade press. Nevertheless, a growing number of users have been attracted to its capabilities, and recent market share statistics from International Data Corp. indicate Cabletron is now in third place behind HP and SunSoft, the acknowledged management platform leaders.

Spectrum has received ongoing attention for the quality of its technical execution providing a distributed platform with a client/server architecture, an object-based framework, access to distributed management information, and an intelligent inference engine to reduce alarms and extract meaningful information. Cabletron also has recently developed management applications for Cisco, UB Networks, Bay Networks, 3Com and Retix products. This is another innovative move, since these competitors are unlikely to port their own management applications to Spectrum.

The Spectrum Test Drive is an opportunity for network managers to evaluate an alternative management platform in the only test environment that really matters — their own networks. I urge users to consider taking advantage of the test-drive. Cabletron is making it as easy as possible in terms of resources, training and support for users to do this. This is a unique opportunity to make some real-world comparisons and find out which vendors can deliver the industrial-strength solutions the market continues to demand.

McConnell is president of McConnell Consulting, Inc., based in Boulder, Colo. He can be reached via the Internet at johnmc@mcconnell.com.



IN-BOX

Deadly deal

The news that Computer Associates International, Inc. (CA) intends to buy LEGENT Corp., thereby sucking LEGENT into the vortex of software oblivion, is an absolute horror (May 29, page 12).

This deal is entirely cash motivated. Sure, CA says it will integrate its products with LEGENT's, but what is really happening here is LEGENT, CA's closest competitor, is being eliminated.

With its elimination, the industry as a whole is going to find itself with products that no longer grow and flourish like they did under their original designer. Instead, LEGENT's products will be converted to CA's internal standards, which means CA will stuff CAIRIM and CA licensing bull into the products and offer them to potential customers as the "software superior by design."

Yeah, sure. But just like all the other software it offers, CA didn't design it, and it sure as heck isn't improving it — CA is only making money off it because there aren't any competitors that can afford to develop rival products to which customers can migrate.

And if that isn't enough, the products that CA does create it has to give to you as part of the products it has bastardized with its meddling. We're all left with the sad dilemma of poor maintenance, no upgrades, no enhancements and sloppy customer support for products that begin to fail and wreak havoc on an otherwise stable mainframe environment.

CA's purchase of LEGENT won't get any applause from me. And anyone else out there who agrees with me, you need to start yelling now.

Robert Becraft
Laurel, Md.

Send Unix packing

Regarding David J. Buerger's column "Blowing up Windows isn't always the right option" (May 29, page 79):

It's funny that network managers are say-

See **In-box,** *page 33*

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Forgiving NETWORK FAULTS

By Howard Marks

Constantly worrying because your network has to be up around the clock? These four products make it easier for you to relax.

Today, 24-hour operation is a given for many organizations. That leaves little margin for unexpected downtime. Fortunately, there's an array of products that provide a measure of fault tolerance for these nets.

The products we tested help keep downtime to a minimum by saving copies of crucial files. Each uses different mechanisms to meet the requirements of high-availability computing, but all improve network reliability.

Horizons Technology, Inc.'s LANshadow uses a periodic copy function to protect files, making it suitable for organizations such as law firms, whose work involves a multiplicity of small files. Vinca Corp.'s StandbyServer 32 provides disk mirroring, while Netguard Systems, Inc.'s NSI 5000-100 offers disk switching. These two approaches are more appropriate for protecting critical databases, but remember that a disk-based product loses data that's still in the write cache when the server goes down.

For sites that can make sure that every user has the right terminate-and-stay-resident (TSR) programs loaded, NonStop Networks' NoStop Network give sites true server mirroring and the highest level of data integrity.

These products are important not just for their ability to improve overall system reliability, but also because some of them can be used to solve every network administrator's twin problems of scheduling off-hours maintenance and dealing with an ever-shrinking backup window. With mirrored servers, you can switch each off individually and perform maintenance. You can similarly break the link between the servers and back up the secondary server to tape while users continue to access the primary server.

When using any of these server-based systems, you must be careful to periodically test to make sure the secondary server can support all your applications at the same time. We've seen network administrators configure systems that didn't work in an emergency because the primary server had its disk, memory and NetWare Loadable Module (NLM) configuration upgraded while the backup server had not.

Horizons' LANshadow

The oldest product in this roundup, Horizons' LANshadow, has come a long way from its modest beginnings as a DOS application that ran on a dedicated personal computer to copy files from one server to another. LANshadow now uses an NLM but is still more an automated backup system than a true provider of fault tolerance.

LANshadow allows a network administrator to automatically copy files from one NetWare 3.X or 4.X file server to another. The LANshadow NLM on the destination file server logs on to the source file server and copies files from the designated directories that have changed since the last cycle.

The network administrator can define any number of source/destination directory pairs. A single-source directory can have multiple destinations, and a single file server can back up multiple servers. Administrators can exclude files from the backup process and can even designate a group of files to be a file family that must be copied together.

When LANshadow copies a file family, it locks all the files in the family before copying them to ensure that they are all in sync with one another. LANshadow

Continued on page 32

NetResults

Product	LANshadow Version 4.01C	NSI 5000-100 Version 3.22	NoStop Network Version 4.11	StandbyServer 32 with Autoswitch Version 1.3
Method of operation	Periodic backup to other server via NLM	Automatic SCSI switch	Client request duplication	Drive mirroring across two systems and high-speed link
Pros	▲ Low cost ▲ No hardware required	▲ Real-time data duplication ▲ No network traffic generated	▲ No hardware required ▲ Low cost ▲ Real-time data duplication and recovery	▲ Real-time data duplication ▲ No network traffic generated
Cons	▼ Not duplicated in real time ▼ Copies whole files ▼ Creates LAN traffic	▼ Recovery not in real time ▼ Can lose data in write buffer ▼ High cost	▼ Creates LAN traffic ▼ If user accesses protected data without TSR, duplicate not updated	▼ Can lose data in write buffer
Vendor	Horizons Technology, Inc. 3990 Ruffin Road San Diego, Calif. 92123 Phone: (619) 292-8331 Fax: (619) 292-9439 E-mail: info@horizons.com	NetGuard Systems, Inc. 3020 Old Ranch Parkway Seal Beach, Calif. 90740 Phone: (800) 670-0003 (310) 799-5533 Fax: (310) 799-5590 E-mail: 73131.651@compuserve.com	NonStop Networks 20 Waterside New York, N.Y. 10010 Phone: (212) 481-8488 Fax: (212) 779-2956 E-mail: 71603.1751@compuserve.com	Vinca Corp. 4000 Central Park East 1815 S. State Street Orem, Utah 84058 Phone: (801) 223-3100 Fax: (801) 223-3107 E-mail: saria@vinca.com
Price	$495 for primary server; $295 for additional servers	$6,200	Price based on number of users ($1,290 for 5 users; $2,915 for 100 users)	$2,599 (ISA); $2,999 (EISA or MCA)

Continued from page 31

Version 4.0 adds the ability to copy Macintosh files and to establish what Horizons calls no-lock file families, which can be backed up even if other users have these files open.

LANshadow maintains a master schedule on each destination server, setting the range of times during which each of its backup phases may run, including an optional delay between each phase. Each source/destination directory pair can have an individual schedule that overrides the master for that pair.

The Novell alternative

Novell, Inc. recognized early on that reliability was key to getting companies to accept LAN technology. It introduced System Fault Tolerance (SFT) features in NetWare as early as 1983. Disk mirroring is now a standard feature of NetWare. Later developments, such as disk arrays, further protect LAN data from drive failures.

Of course, not all data loss can be prevented by protecting the disk subsystem. NetWare SFT III also protects against server processor, power supply and LAN card failures by mirroring the entire file server to a duplicate system. The two servers communicate across a dedicated high-speed link, typically 100M bit/sec, constantly checking each other. Should the primary server fail, the backup server takes over immediately.

NetWare SFT III has its drawbacks, the most obvious being cost. You must have two essentially identical file servers, a pair of high-speed LAN cards and two copies of NetWare SFT III, which costs as much as $10,000 per copy. Since SFT III protects an entire file server, you have to accept this high cost even if you only need to provide such full-blown protection for a few critical databases.

You may also have problems fitting SFT III into your network, as it is only available as a version of NetWare 4.X. And over its short history, users have had problems with SFT III not supporting some NetWare Loadable Modules (NLM).

The final problem is that with today's server hardware, most server crashes aren't caused by hardware failures, but rather by faulty NLMs or other code. Since SFT III duplicates the entire server, an NLM failure usually means both servers will go down.

LANshadow can copy files at up to 15M byte/min and scan files to see if they need to be changed at up to 100M byte/min, depending on the server, network hardware and network load. In our tests, the product copied just over 100M bytes of data in 22 minutes. That's not bad considering that our servers are slow.

LANshadow's real drawback is the time it takes to back up large amounts of data. If a user makes an update to a 1G-byte database, it will be hours before that database is completely backed up. This makes LANshadow a better solution for protecting word processing and other small files that are closed on a regular basis than a real fault-tolerant solution for mission-critical applications.

LANshadow only runs during NetWare idle cycles, so server performance shouldn't be affected, and it wasn't in our testing. It does create significant network traffic, so if different servers on your network are idle at different times, you may still see a performance hit.

NetGuard's NSI 5000-100

NetGuard's NSI 5000-100 is an automated electronic version of the simplest high-availability technique, the Small Computer System Interface (SCSI) switch. To use a SCSI switch, you connect an external SCSI disk subsystem or SCSI drive array, a file server's external SCSI port and a backup server's external SCSI port to the switch. Under typical conditions, the file server communicates to the disk drives over the SCSI bus as if the switch wasn't there. If the primary server fails, you just flip the switch to connect the disks to the backup server and boot the backup as your file server.

NetGuard has taken this concept to its ultimate level by also connecting a serial port from each of the two file servers to the switch and adding NLMs to the primary file server that talk to a DOS program on the backup. Should the backup server fail to communicate with the primary server, it uses its second serial connection to the NSI 5000-100 to flip the switch, then reboots itself as the file server. It can use the modems in the NSI 5000-100 to call a pager and let an administrator know what happened.

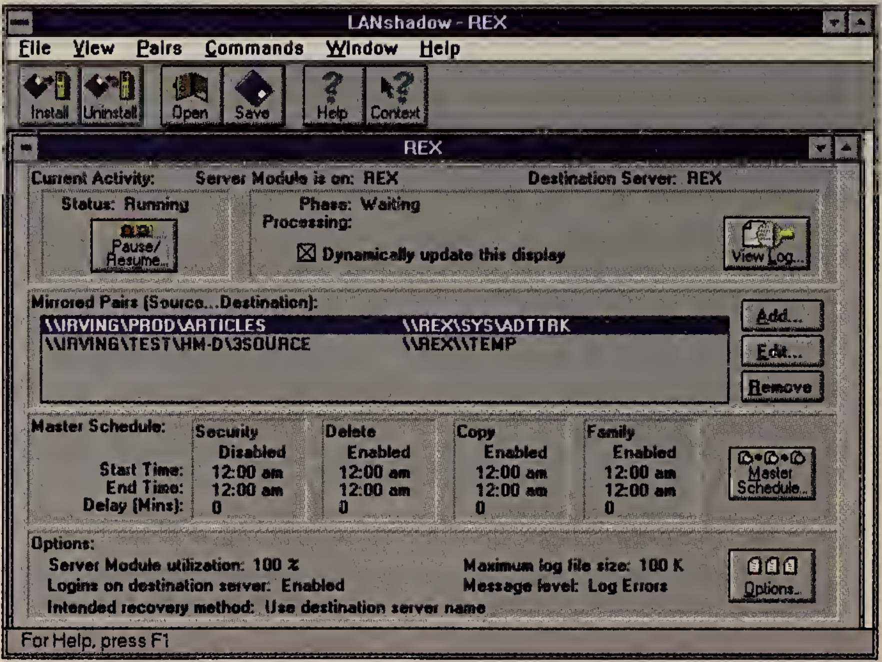
The NSI 5000-100 is certainly robust. It has a two-channel switch to support both SCSI channels for a server with two redundant power supplies, fans and even 2,400 bit/sec modems. All these components are in a rack-mountable case that could probably stop a .38-caliber bullet at short range. It includes a front-panel key switch for manually connecting the SCSI bus to either of the two servers.

Like Vinca's StandbyServer 32, NetGuard's NSI 5000-100 software bypasses the NetWare warning that only half of a mirrored pair is available and automatically runs Vrepair to repair disk volumes. NetGuard's software can also notify administrators via NetWare's Send facility or pager concerning failures of either server, one of the NSI 5000-100's power supplies, or a volume or cable failure. An administrator can also dial in to either of the two modems to check systems status.

Like StandbyServer 32, NetGuard's software addresses the fact that the primary and secondary servers might have different hardware configurations by storing additional AUTOEXEC.NCF information in a backup server file and swapping the files as part of the reboot process.

In our testing, the NSI 5000-100 performed exactly as we had expected. Switchover time was about the same as with Vinca's product.

Our big question is whether the $6,200 price of the NSI 5000-100 is worth it. A manual SCSI switch costs $500 to $1,000; the extra $5,000 or so seems like a lot to pay for automatic switchover. With Pentium systems selling for less than $2,000, we expect a little more than a solid cabinet and an electronic switch for three times the price.



Current Activity: Server Module is on: REX Destination Server: REX
Status: Running
Phase: Waiting
Processing:
☒ Dynamically update this display

Mirrored Pairs (Source...Destination):
\\IRVING\PROD\ARTICLES \\REX\SYS\ADTTRK
\\IRVING\TEST\HM-D\3SOURCE \\REX\\TEMP

Master Schedule:	Security	Delete	Copy	Family
	Disabled	Enabled	Enabled	Enabled
Start Time:	12:00 am	12:00 am	12:00 am	12:00 am
End Time:	12:00 am	12:00 am	12:00 am	12:00 am
Delay (Mins):	0	0	0	0

Options:
Server Module utilization: 100 %
Logins on destination server: Enabled
Intended recovery method: Use destination server name
Maximum log file size: 100 K
Message level: Log Errors

For Help, press F1

LANshadow's *well-designed interface lets administrators specify mirrored directory pairs and a schedule for protecting selected directories.*

NetGuard's other NSI 5000 models allow you to build a system that uses one standby server to protect data on several primary servers through multiple SCSI switches. Of course, the standby server can only replace one server at a time, but this could still be a more cost-effective solution than having a dedicated standby server for each of several primary servers.

Fault tolerance for Windows NT

Windows NT users have an alternative for fault tolerance in Octopus Real Time Data Protection from Octopus Technologies, Inc. While Octopus, like Horizons Technology, Inc.'s LANshadow, is a server-based process that sends data to a backup server, the similarity ends there. Rather than copy changed files, Octopus duplicates only file updates to the additional server, and it sends them in real time to the backup server.

Octopus runs as a Windows NT service in each machine. It uses Windows NT's remote procedure call facility to transmit data to the target system. This means that the backup server can be anywhere on a TCP/IP-based internetwork, even on the other side of a WAN link.

Octopus even logs file I/O updates to a disk file if the backup server is temporarily unavailable; therefore, an administrator with a true 24-hour-a-day, seven-day-a-week application could create a window for backup from the second server by stopping the application for a minute, breaking the link to the backup server and then restarting the application. When the administrator reestablishes the link, the logged transactions are applied to the backup server.

Any machine running Octopus can be used to specify the files and directories to be protected on any other Octopus machine. Octopus can even automatically check for circular references.

Octopus supports all versions of Windows NT, including Reduced Instruction Set Computing and PowerPC, and a Windows 95 version is in the works.

Octopus Workstation costs $395, while Octopus Server is priced at $3,975.

Octopus Technologies: (215) 822-8075.

NonStop's NoStop Network

Unlike the other products reviewed, NoStop Network takes a workstation approach to fault tolerance, using a 10K- to 15K-byte TSR program on DOS workstations for a truly fault-tolerant system. It's also the only product we tested that works for network operating systems (NOS) other than NetWare.

The network administrator who installs NoStop Network defines a series of logical drive pairs. The NoStop Network TSR intercepts requests to write to the primary drive in a defined pair and duplicates write requests to the secondary member of the pair.

To ensure data integrity, NoStop Network also duplicates file and record lock requests so that databases on the secondary drive are protected. The secondary member of the pair, therefore, has an identical duplicate copy of all of the files on the primary member of the pair.

To ensure that the primary and secondary drives remain mirror images of each other, NoStop Network traps write requests made to the secondary drive and revectors them to the primary drive so they can be mirrored. If the G: drive is the secondary drive for F:, a user who tries to make the G: drive the active drive at the DOS prompt will instead get the F: drive.

NoStop Network includes another TSR that duplicates requests for users of the Btrieve Virtual Loadable Module (VLM) database server, so Btrieve databases can be mirrored to duplicate database servers.

If a read error is reported on a primary drive, NoStop Network traps the critical error and allows the user to continue working from the secondary drive. If the network administrator sets up the two drives of a mirrored pair to be on separate file servers, users can continue to work even if the primary server fails.

Unlike with Novell, Inc.'s System Fault Tolerance III (SFT III), the two servers need not be identical. In fact, the only requirement is that a single workstation be able to map drives to both servers simultaneously and that both servers have sufficient disk space for the protected directories. You can even use NoStop Network to mirror a local drive to a file server to protect local data.

NoStop Network runs with any NOS that supports redirected DOS drives, including peer systems such as Artisoft, Inc.'s LANtastic. It even works with OS/2, if you load NoStop Network in a DOS box with the application whose data you're trying to protect.

NoStop Network includes a recovery utility that resynchronizes a drive pair if changes are made while one drive is unavailable. This utility, which is also the best way to set up the secondary drive, is quite speedy when copying only the changed data from the primary drive to the secondary drive.

NoStop Network's TSR-based approach has a few drawbacks. While the NoStop TSR can be loaded into upper memory blocks by most memory managers, it must be loaded last in the Int 20-24 chains that control requests to DOS for file and disk access. If a system loads another driver or TSR after NoStop Network that traps these interrupts, the server may not become fully mirrored.

Also, since requests are duplicated across the network, there is an increase in network traffic when the product is running. On our lightly loaded test network, traffic increased about 30% when we ran NoStop Network, and database access and file-transfer benchmark performance fell less than 5%. Heavily loaded networks may see more significant performance losses due to network saturation.

NoStop Network — while it does work with Windows 3.X — lacks a Windows user interface and is somewhat less flexible when operating under Windows. When running without Windows, the TSR reports errors, such as drive failures, to the user and offers a menu of actions to take. Since the TSR cannot do this when the user is running Windows, the net administrator must determine ahead of time what to do when there is an error and set up NoStop Network to take that action and log errors.

The most significant problem we found is that a single user writing data to the primary drive without the NoStop Network TSR loaded will cause a mirror mismatch. Network administrators must have tight control over user workstation configurations to prevent this occurrence.

Vinca's StandbyServer 32

Vinca takes an interesting approach to providing fault tolerance. At first glance, a network running Vinca's StandbyServer 32 looks an awful lot like one running NetWare SFT III. There are two file servers — both running NetWare — connected to the LAN and to each other through a high-speed interserver link.

The critical difference is that rather than two servers running identical NetWare copies across the high-speed link, only one server is actually servicing users. The other is acting as the world's smartest hard-disk subsystem.

StandbyServer 32 takes advantage of NetWare's disk mirroring functionality to provide a "warm" backup server. A series of NLMs in the file server make the disks in another computer running NetWare Runtime (a special one-user OEM version of NetWare 3.12) look like just another disk subsystem. An administrator then mirrors one drive in the server with a duplicate drive in the backup server. The server communicates with the backup across Vinca's proprietary 160M bit/sec parallel server-to-server link to talk to the secondary drive of the mirrored pair.

With earlier versions of StandbyServer 32 and with Vinca's older StandbyServer — which used a DOS program in the second server, rather than NetWare Runtime — users would have to manually restart the standby server as a NetWare server when the primary server failed. With Vinca's new Autoswitch option, if the standby server can't communicate with the primary server over either the server-to-server link or over the LAN via IPX, it automatically restarts itself as the failed primary NetWare server after a short countdown.

The Autoswitch process automatically updates the AUTOEXEC.NCF and STARTUP.NCF files to allow the primary and standby servers to use different LAN cards, disk controllers and other devices. It also automatically runs Novell's Vrepair utility if the volumes on the mirrored drive are damaged due to the primary server failure. After disk volumes are repaired, they are automatically mounted.

In our testing, running StandbyServer 32 was about 10% slower than running two SCSI drives duplexed on separate Adaptec Corp. AHA-1522 host adapters, which is still somewhat faster than running a mirrored pair of drives from a single host adapter. When we pulled the plug on the primary server, the backup was up within 5 minutes. For users running Version 1.20 of Novell's VLM, which automatically reconnects to servers, a primary server failure looks like a momentary interruption.

Different strokes

For many net administrators, NoStop Network is the best way to provide true fault tolerance without the expense of NetWare SFT III. For those looking to achieve high levels of fault tolerance using a NOS other than NetWare, NoStop Network is definitely the best choice. Since almost all the other products on the market are NetWare-specific, users of other NOSes, such as IBM's LAN Server, should take a good look at No-Stop Networks.

LANshadow's periodic copy function makes it a good choice for protecting companies with large numbers of small files, but it's not a good choice for the single mission-critical corporate database. StandbyServer 32 and NSI 5000-100's disk mirroring and disk switching approaches are more appropriate for that critical database. ■

The alliance is a cooperative of users, consultants, educators and integrators that applies its technical and business skills to analyze and compare strategic network products. A list of alliance partners can be found on page 29.

Marks is chief scientist at TigerTeam, Inc., a South Norwalk, Conn.-based consulting firm specializing in Windows 95 and Windows NT network integration. He can be reached at hmarks@pipeline.com.

RFC

Request for Comment

The Network World Test Alliance will begin a series of server benchmarking reviews later this year. We'd appreciate some reader input on the kinds of testing you'd like to see.

What network operating systems should be the platform for the tests?

How much emphasis should we give to each of the different subsystems? Disk performance? CPU speed? Network throughput? Others?

Are there any good ways to test system stability?

Are there any commonly available benchmarks that provide good indications for each of the subsystems? Or, what kind of tests should we create to do so?

Is there any other information you'd like to see when we review each new server?

Send your comments to Test/Reviews Editor Lee Schlesinger at lschlesl@nww.com.

HOW WE DID IT

Our primary server was a 486/33 file server running NetWare 4.1, with an AST Research's Advantage 486SX/25 running NetWare 3.12 as our secondary server. Both were equipped with 16M bytes of memory, Standard Microsystems Elite 16 Ethernet cards, Adaptec AHA-1522 SCSI host adapters and Seagate 650M-byte SCSI hard drives.

We tested all the products using a database access benchmark written in Microsoft FoxPro and a file-transfer benchmark. For three of the products, we cut the primary file server's power during the database access benchmark, measured the time it took to recover and checked to see whether any data was lost. Since LANshadow doesn't perform real-time data duplication, we skipped this test and measured how long it took LANshadow to perform a backup cycle of our test directory.

NETWORK HELP DESK

Continued from page 29

Our organization wants to set up our own Internet Web server, and I was asked to look into it. Where do I begin?

Amir Mousavizadegan, Riyadh, Saudi Arabia

A good starting place to learn how to configure a Web server, create hypertext pages and even advertise the service is — oddly enough — the bookstore, says Howard Bleiwas, a staff consultant for EJR Computer Associates, Inc., a consulting firm in Hoboken, N.J.

Spinning the Web: How to Provide Information on the Internet by Andrew Ford (Van Nostrand Reinhold, 1994), *World Wide Web Bible* by Brian Pfaffenberger (MIS Press, 1995) and *Teach Yourself Web Publishing with HTML in a Week* by Laura Lemay (Sams Publishing, 1994) can help.

For additional information about Internet service providers and other resources in Saudi Arabia, simply point your Web browser at http://www.ntt.jp/AP/asia-SW.html.

Also, you can call either the King Abdul Aziz City for Science and Technology (KACST) — the main Internet node for Saudi Arabia — or the King Faisal Specialist Hospital in Riyadh.

As another option, you should try contacting vendors such as Al-Waseet, a division of Saudi Telecom, or Gulfnet, located in nearby Kuwait, to see if they can sponsor you onto the Internet.

MIS Press: (800) 488-5233; Sams Publishing: (800) 691-3388; Van Nostrand Reinhold: (800) 842-3636.

In-box

Continued from page 29

ing, "Why won't Microsoft Corp.'s Windows just go away?" when they should be saying, "Why won't Unix and its multitudinous varieties go away?"

I'm a guy who wants to see computers flourish at the mass level. Apple Computer, Inc. and Microsoft have made computers usable and accessible. Unix can't claim either virtue.

Mark Ramos
Newport Beach, Calif.

Washed-out Windows

In his column "Blowing up Windows," David J. Buerger makes good points about people fearing change. He also makes a good point about how Microsoft has yet to articulate a real architecture, other than "Windows everywhere" and "Information at your fingertips," which sound nice yet say nothing.

I am seeing many customers beginning to demand more, but there are enough organizations that will move forward with Windows 95 without thinking. These folks will be in big trouble, since Windows 95 is a lousy enterprise client from many perspectives.

Customers need to awaken from years of poorly considered and implemented computing systems and look to environments where things work — minicomputers and mainframes. The services in those environments must be available in the distributed world, and many are available in the Open Software Foundation's Distributed Computing Environment.

John Dohm
Chicago

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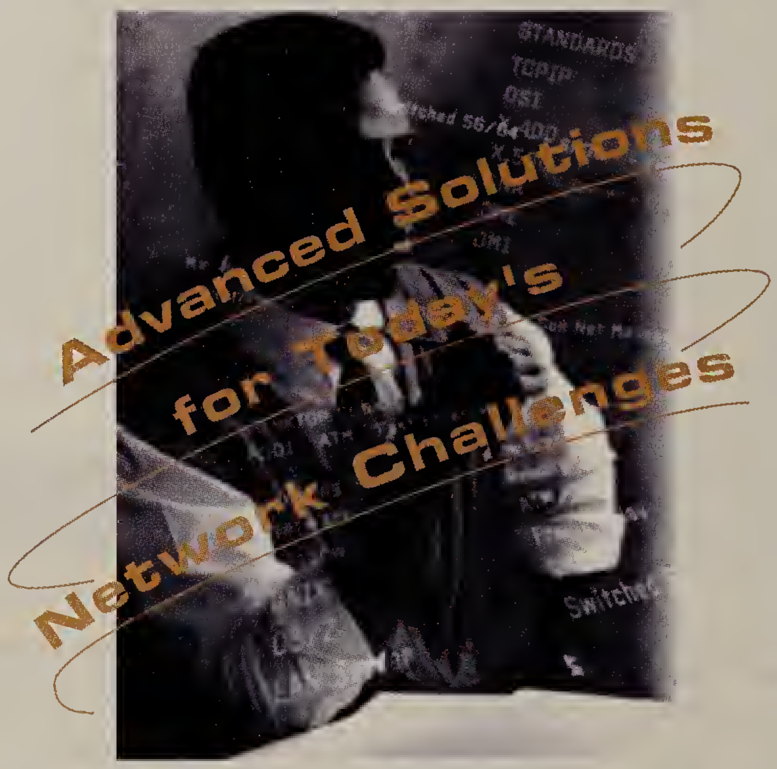

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Briefs

CACI Products Co. *and the* **Society for Computer Simulation** *will hold their Simulation Conference 21 Aug. 14-18 in Arlington, Va. Developers and users will present their ideas about a number of simulation-related topics, including how hierarchical communications network simulations can make network planning easier.*

For more information or to register for the conference, call Cindi Homouda at (703) 875-2920.

Advanced Network Technologies, Inc. (ANT) *has created its* **Strategic Consulting Division** *to meet the needs of users in finance, manufacturing and consumer services businesses.*

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Plan now for smoother E-mail migration

Starting early to plan your move to client/server E-mail can help avoid a one-time hit to your messaging budget.

By Daniel Blum and Gary Rowe

Considering a move to a client/server electronic mail environment? If you've got even the slightest inclination to answer yes, you'd better get cracking on your migration and budget plans.

Starting the job now will enable you to spread your migration costs over the two to three years it will likely take to complete the transition and, thus, help avoid a huge one-time hit to your messaging budget.

The lack of widely available products is the main reason it will take a few years to break ties to your existing host- or LAN-based E-mail system that uses a file-sharing architecture.

So far, Digital Equipment Corp. and Hewlett-Packard Co. are the most notable vendors offering client/server messaging tools.

Other heavyweights, including Lotus Development Corp., Microsoft Corp. and Novell, Inc., are straining to get their client/server products out in 1995 or early 1996, as much as a year later than originally planned. IBM's acquisition of Lotus adds another variable, although it should provide increased integration between Lotus Notes and IBM systems.

The traditional delay from the time any new product is announced to the release of a beta version, as well as the time it takes to go from a beta version to general availability, likely will push product acquisition costs into late 1996 or early 1997.

The cost-savings promise

Still, planning now to move to a client/server messaging environment is, for most organizations, a step in the right direction. Client/server technology holds the beacon of hope for trimming ongoing messaging expenses because it delivers expanded functionality such as group collaboration.

A client/server messaging environment employs routable protocols between clients and servers in place of the file-sharing method used in many of today's LAN-based E-mail packages. This architectural difference will enable the next-generation messaging server software to run on a scalable, multiprocessing platform that can be located anywhere in the enterprise as opposed to DOS-based file servers distributed across departments.

Many enterprises migrating from host-based E-mail to a file-sharing messaging environment quickly bump up against the capacity limitations imposed by DOS-based servers, meaning more servers must be added as the number of users increases. The ability to support E-mail, calendaring and groupware in a file-sharing environment is limited to workgroup pockets only.

Running server software on scalable hardware gives you the ability to pull messaging functionality off departmental machines and put it on to regional servers or even a central site.

This, in turn, increases the number of users per server, reduces the number of mail administrators needed and extends advanced functionality across the enterprise.

As you move to a client/server-based environment and scalable servers, your hardware support and system integrity costs should fall as fewer administrators are needed to support more users. Part-time post office administrators in each department can go back to their core job function — be it research, administration or sales — while a much smaller number of in-house or external professionals take over the support function.

Examining operational expense

Once you understand how client/server E-mail can cut costs, the next step is to determine how much you can or should bite off in the next fiscal year. There are a number of operational expenses you can be gearing up for now, and they are often the easiest to overlook when budgeting.

You'll need to do a fair amount of retraining for end users, administrators and help desk staff, so look for ways to beef up that training line item now. Then there's the cost of programming new E-mail-enabled applications to run in the client/server environment as well as porting existing applications to the new world. You may want to start setting money aside now to cover some of those programming costs.

The graphic above describes how some of the major operational elements in a messaging environment will be affected by a move to client/server technology. Remember that changing an existing environment generally will increase the operational budget by many times.

As you craft your messaging budget and strategy, you'll be watching the tea leaves closely and trying to determine how real client/server messaging products are and where the technology is headed. At the same time, more and more glossy marketing literature that promises delivery of standards-based client/server messaging and groupware this year will be rolling off the presses.

Senior executives viewing vendor marketing material likely will demand results in fiscal 1996 or 1997.

As these executives demand more for less, the temptation will be to promise you'll have something this year when one of the Big Three — Lotus, Microsoft and Novell — comes out with its client/server products.

But be careful in making that promise. Nobody wants to empty the corporate coffers on the messaging equivalent of the beta videocassette format or forget key budget elements, only to have to go back to senior management six months later for an unanticipated handout.

Blum and Rowe are principals with Rapport Communication, an electronic messaging consultancy, and authors of a report that evaluates the next-generation messaging offerings of Lotus, Microsoft and Novell. Blum can be reached by phone at (301) 585-4717 or via the Internet at dblum@interramp.com. Rowe can be reached at (513)779-8750 or via the Internet at gjrowe@attmail.com.

Line itemization

Budget areas affected by move to client/server E-mail:

Staff

- You may see administration costs decrease following a successful migration to client/server E-mail as functions currently performed by departmental staff are consolidated into fewer hands at a central site.
- You'll need to fund the development of new client/server E-mail-enabled applications.
- You'll probably have to hire someone who is an expert in your chosen client/server E-mail package.

Training

- Help desk staff may need some retraining to understand how to resolve new sets of problems.
- You'll also need to retrain end users, which can be a huge cost.

Soft costs

- Expect an increase in network utilization as client/server E-mail and the group collaboration it enables take hold.
- You also may see a spike in Internet or public E-mail network access charges as more E-mail-enabled applications make it easier to reach users outside of the internal net.

THE NETWORK PAYCHECK

A glimpse at what you'll need to match to keep salaries competitive.

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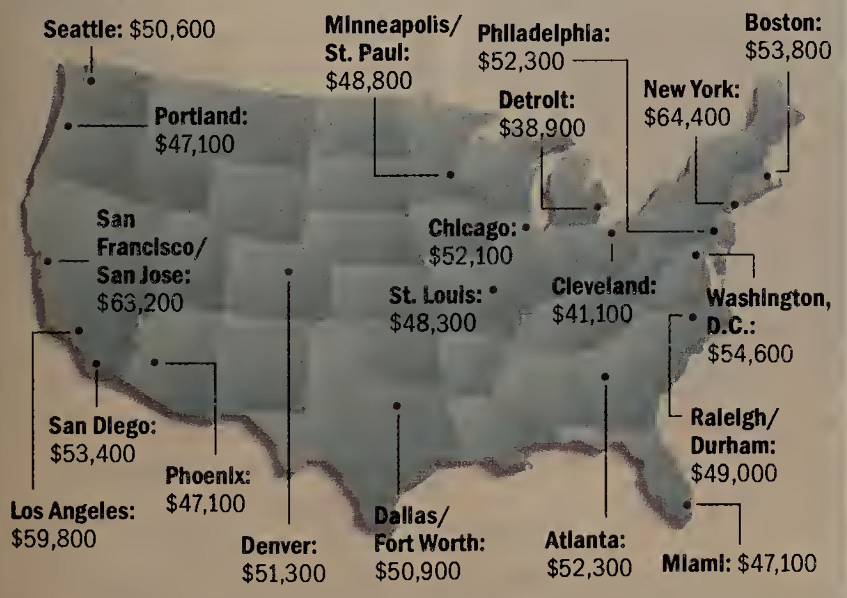

Note: Figures represent the median salary at which half of the respondents earn more and half earn less. Information is based on data from more than 1,467 respondents.

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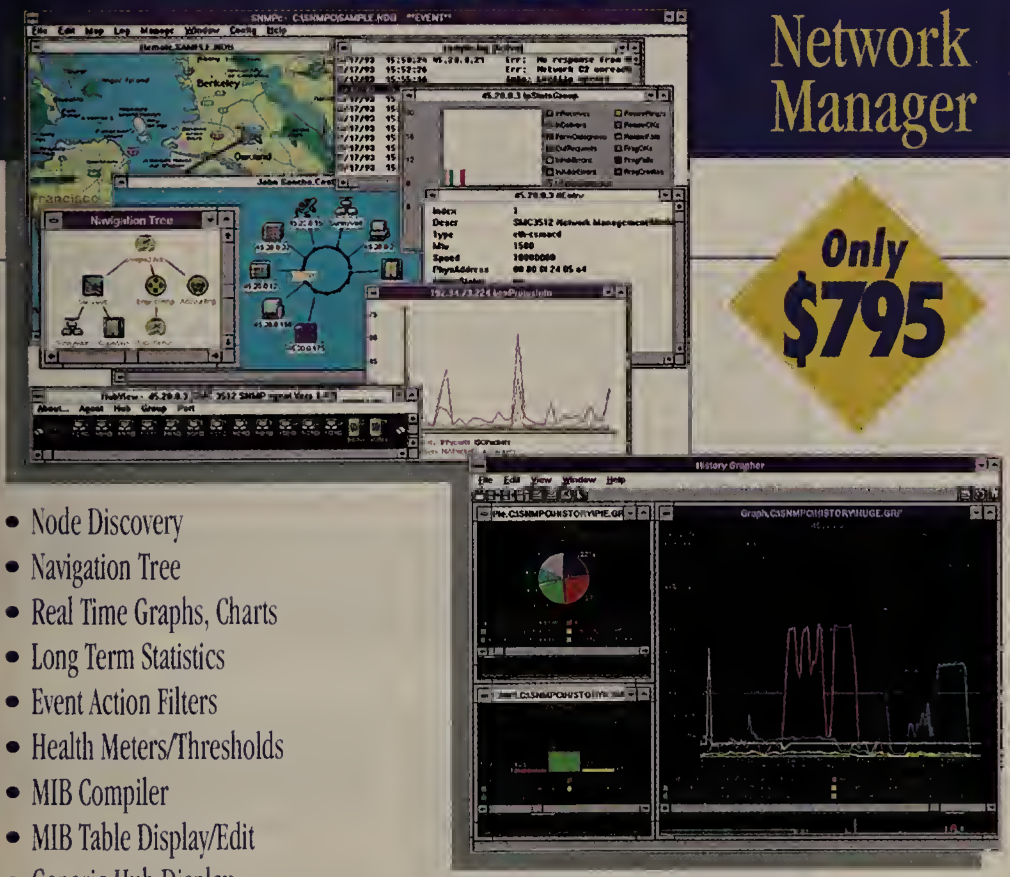

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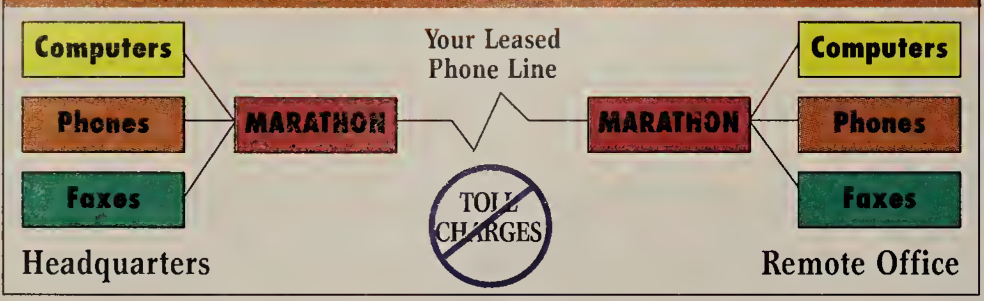

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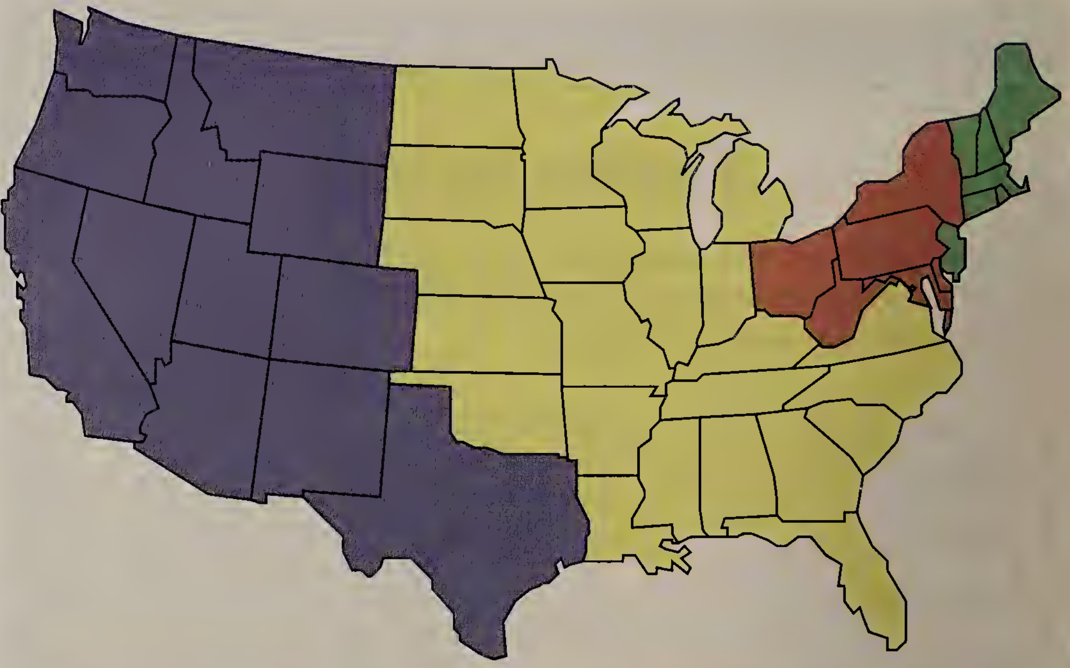

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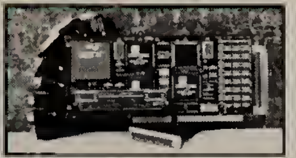

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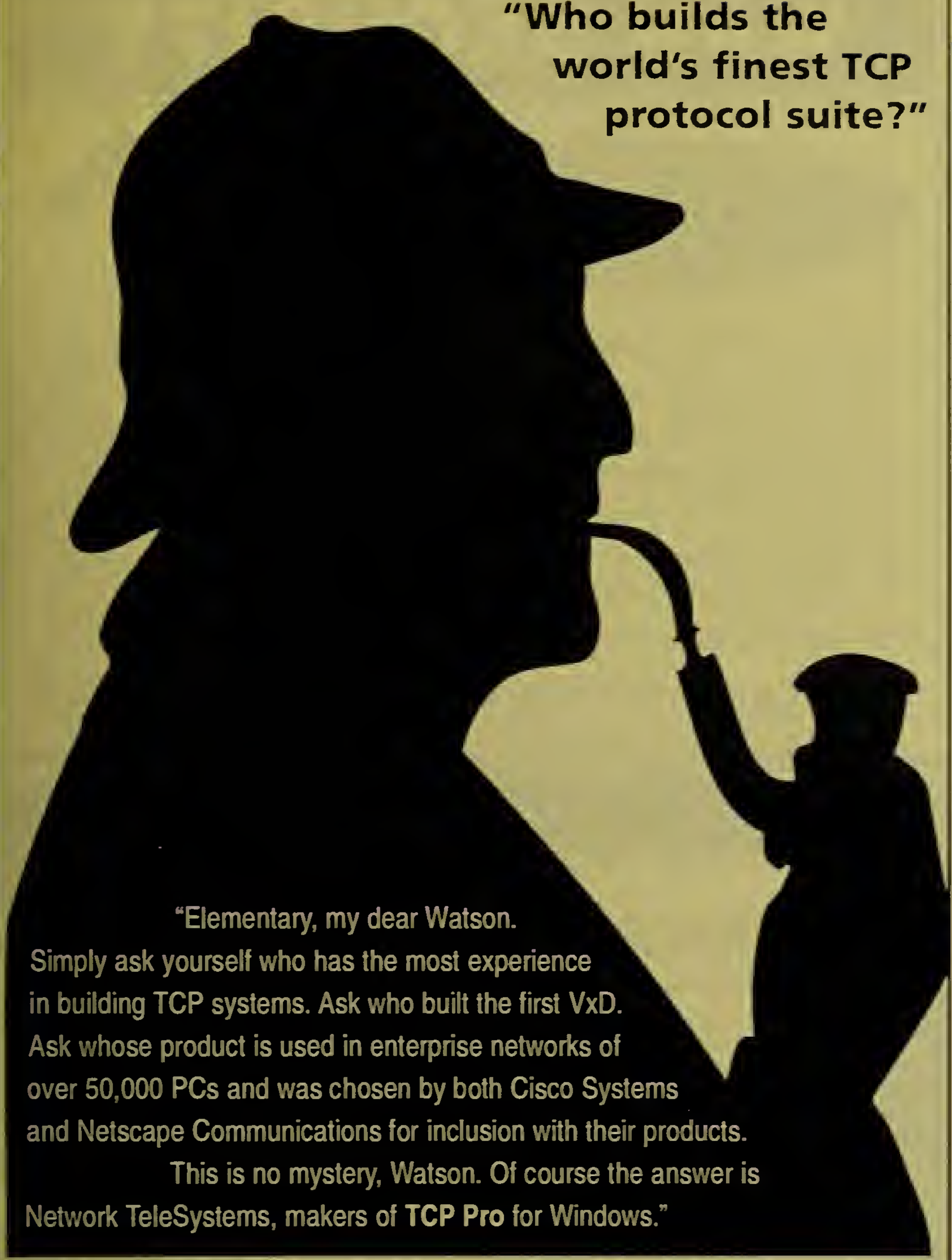

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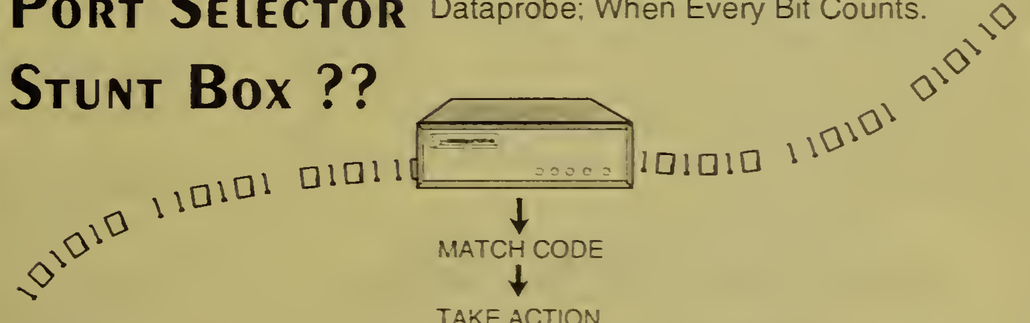

MATCH CODE
↓
TAKE ACTION

A/B Switch Power ON/OFF Page Re-Boot Back-up Alarm Report

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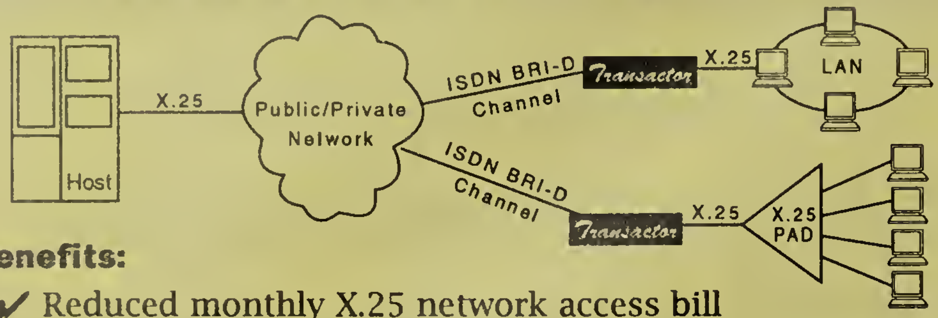

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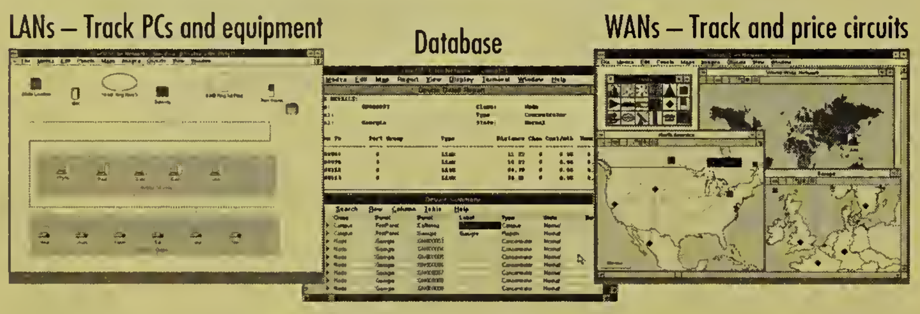

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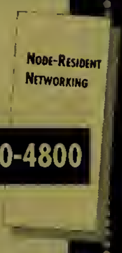

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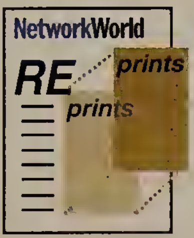

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Novell

Continued from page 1

personal computers and other network devices in remote offices or homes to local nets at higher speeds than modem connections, according to Chris Sontag, director of product development and marketing for Novell's extended networks division. The technology will ship late this year or early next year.

Practical concept

While Powerline Technology certainly stretches the concept of networking, it's not such a far-fetched idea, said Jack Gold, an analyst at META Group, Inc. in Stamford, Conn. Electric power travels over almost the same type of copper cable as do Ethernet data packets. The 110-volt current adds noise and interference, but it leaves plenty of transmission capacity to play with.

"There are limitations because you have electricity running over the power lines, but if you're willing to do enough signal processing [to eliminate noise], you can get some very effective bandwidth," Gold said.

Systems from home automation vendors such as Echelon Corp. in Palo Alto, Calif., send signals across power lines on several frequencies to ensure noise on one frequency will not blank out the whole transmission.

Adding Powerline Technology to the mix of LAN media can give net managers greater design flexibility.

Remote or temporary offices with few users are good candidates for the technology, as are devices such as building control systems, which do not need full-time net connections, Gold said.

Novell is working with an unnamed utility company that, like many other utilities, is hoping to resell capacity on its own broadband net and can provide the needed reach through its electrical grid into homes and offices.

Here's how it would work: Users at home or in small branch offices could plug their PCs into their electric circuit using a power line modem that would convert Ethernet traffic to Powerline Technology traffic. That traffic would go out through the power line to a router on a telephone pole.

The router would convert power line traffic to TCP/IP or another standard net protocol, and deliver it to a company's headquarters, the Internet, a security company or wherever its final destination may be.

The technology, which could yield 2M to 3M bit/sec of throughput, would be a vast improvement for users in small offices that are currently relying on comparatively low-speed modems, Gold said.

Novell is working with modem vendors on a high-speed power line modem that would support NEST, Sontag said.

Technology at work

Networking smart devices across a mix of power lines and other media will likely open the door for companies such as Sears, Roebuck & Co. to offer such services as the ability to remotely monitor and troubleshoot home appliance problems.

Sears officials have described plans for such a service but have not said what technology it would use.

Many utility companies are also exploring plans for home energy management systems that would control appliances, as well as heating and cooling systems.

While the Powerline Technology project involves a utility partner specifically, Novell has announced plans to work with both cable and phone companies to provide connectivity for its NEST initiatives.

"Novell is covering all its bases working with the utility companies," said Warren Causey, associate publisher of Chartwell, Inc., an Atlanta consultancy that watches the utility industry. "With its strategy, whether the connection comes from the power, phone or cable companies, Novell wins."

Senior editor Joanie Wexler contributed to this story.

Oracle

Continued from page 1

panies offer.

The new modules will also help users better integrate their applications by adding workflow capabilities to them. This will build on the electronic mail-enabling technology Oracle added to its Release 10 applications last year.

Now users will be able to kick off workflow processes from within their Oracle applications just as they can send and receive messages while in the applications today.

Other applications vendors, including PeopleSoft, Inc. and SAP North America, Inc., have recently announced plans to add workflow capabilities to their software, as well.

Sources familiar with Oracle's plans said the company will also deliver hooks within its applications that will help users conduct electronic commerce.

Such hooks could be used to set up tracking systems for companies selling their goods on-line.

Oracle declined to comment on the announcement.

According to sources, Oracle has written its SmartClient applications in Oracle Forms 4.5, a tool that supports application partitioning. As a result, users will be able to splice their applications and run code across clients, application servers and database servers, sources said.

In addition, the applications ditch their current character-based interface for a new graphical one.

More than lip service

Analysts said the new software shows that the database giant is pouring lots of resources into its applications business.

"Despite the fact that Oracle has done some good lip service, they really haven't given much profile and positioning to their applications [before now]," according to Barbara Noti, an analyst at META Group, Inc. in Stamford, Conn.

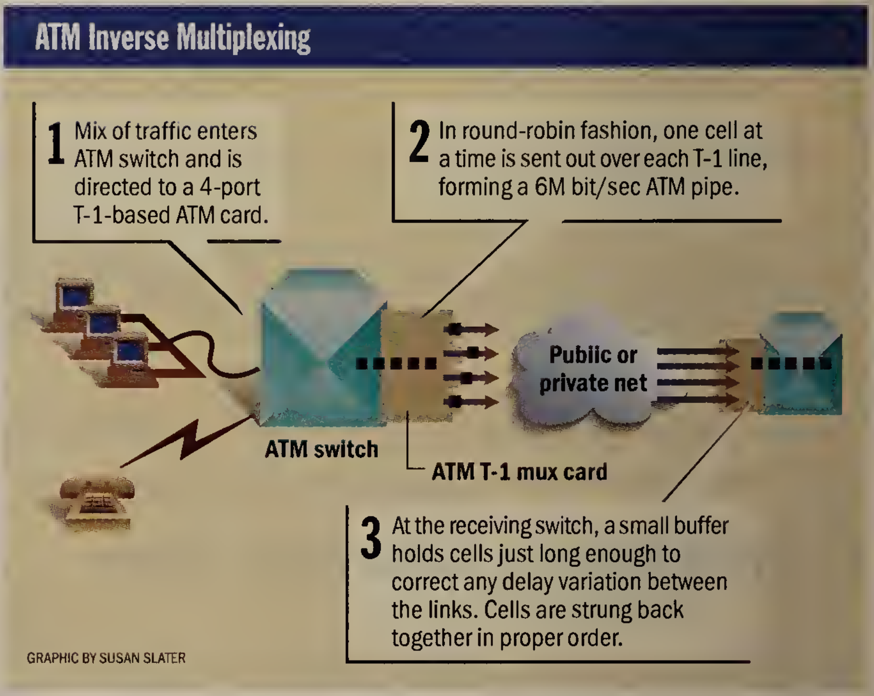
Mark Farnham, president of Rightsizing, Inc., an Etna, N.H.-based consultancy specializing in Oracle applications, said the new workflow capabilities could save users a lot of time. "So much time is spent just coordinating whose turn it is to work on something," he said.

Farnham added that Oracle needs to take great pains to make sure that data from current applications integrates smoothly with the new offerings. "They've stubbed their toes in this area in the past," he said. ■

ATM

Continued from page 1

services and T-3-based offerings. Four ATM-based T-Is, for example, could be combined for a 6M bit/sec connection that costs less and does not have the bandwidth overkill of a T-3 line.


ATM Inverse Multiplexing

1 Mix of traffic enters ATM switch and is directed to a 4-port T-1-based ATM card.

2 In round-robin fashion, one cell at a time is sent out over each T-1 line, forming a 6M bit/sec ATM pipe.

3 At the receiving switch, a small buffer holds cells just long enough to correct any delay variation between the links. Cells are strung back together in proper order.

GRAPHIC BY SUSAN SLATER

"This is going to be a major attraction in the ATM market," said John Coons, director and principal analyst for wide-area networking at Dataquest, Inc. in San Jose, Calif. Because most user requirements for ATM exceed a T-I but fall well short of a full T-3, "[AIM] is going to be the cheapest way to deliver adequate bandwidth. And any manufacturer is going to be able to add the capability without major hardware changes to their equipment," he said.

The AIM specification could be ready by year-end and could be implemented on existing switches shortly thereafter with a fairly simple software upgrade, observers said.

Major contributors to the AIM proposal include ATM switch vendors Northern Telecom, Inc. and StrataCom, Inc., along with chip maker PMC-Sierra, Inc.

A happy medium

Today's ATM standards do not provide a happy medium between 1.544M bit/sec T-I and 45M bit/sec T-3 WAN interfaces. The 25M bit/sec desktop ATM standard applies only to local-area links.

ATM was developed at T-I speeds to meet low-end needs, but it is widely regarded as too limited for many applications. ATM overhead reduces a T-I's capacity by 15% to 20%, a bandwidth reduction that leaves little room for the mixed, bursting traffic that broadband ATM is meant to satisfy.

Some carriers offer fractional T-3 ATM service, but this requires a full T-3 access pipe costing roughly eight to 10 times more than T-I access. All that most users need is the equivalent of four to six T-1s.

"A lot of our ATM planning depends on the tariff crossover between T-I and T-3," said Jeff Tertel, a network development analyst for Commonwealth Edison in Chicago. "We'll probably need 30 to 40 tail circuits off of our SONET rings, and most of them would be under eight T-Is each, so it looks like we'd have good use for ATM inverse multiplexing."

Inverse multiplexing itself is nothing new. It is used in time-division multiplexer networks today with multiple T-Is or 56K bit/sec circuits linking one site to another. The basic idea involves splitting high-speed traffic over multiple low-speed links that are synchronized and recombined at the receiving end.

AIM will work in much the same way. But as a carrier offering, AIM would span only the short distance from the customer premise to the nearest central office switch. Once there, the low-speed links would be recombined and the full traffic stream would enter the carrier net for wide-area transport.

Only in private networks would a high-speed connection be carried over the WAN as a collection of separate T-1s.

AIM will support multiple simultaneous calls, each headed to a different location, and it will support switched virtual circuits for bandwidth on demand. Furthermore, AIM is not limited to T-I bundling. High-speed SONET links could be inverse-multiplexed into gigabit connections, supporting the major bandwidth needs that a few ATM users already face.

Keep it simple

AIM's main attraction will be the ease with which it can be added to current equipment.

The approach being specified by the ATM Forum simply takes turns sending one cell at a time over each separate link. Some additional overhead — roughly 2% to 3% — is added by control information that keeps the lines synchronized, but the end result is a simple, round-robin flow of traffic.

StrataCom, NorTel and PMC-Sierra all plan to offer AIM capabilities once the specification is approved.

"If you're talking about just a few T-Is, it could be done with some firmware changes to our T-1 interface cards," said Shirish Sathe, staff scientist at StrataCom.

The capability will eventually be added to the chips that drive ATM physical layer interfaces, such as those that PMC-Sierra and other vendors build. ■

IBM

Continued from page 6

the end of 1995 (*NW,* Sept. 12, 1994, page 1).

According to sources briefed by IBM, the 3746-950 will be released in two versions. The first, which is expected later this summer, will support the basics — APPN, dependent LU Requestor (dLUR) and an Enterprise Systems Connection (ESCON) mainframe channel connection. APPN is IBM's peer network technology, and dLUR allows existing SNA 3270 data to flow over an APPN network.

A second version, to be available in the first quarter of 1996, will support TCP/IP routing, frame relay and HPR.

IBM is also expected to pair the 3746-950 with a new release of TCP/IP for MVS that will improve TCP/IP throughput to the mainframe by as much as 50% compared to today's 3745-TCP/IP for MVS connection.

"Users will be able to route TCP/IP and handle APPN routing without having to deal with the overhead associated with VTAM and [Network Control Program]," said Atul Kapoor, principal of the Kaptronix, Inc. consultancy in Haworth, N.J.

Tools to help users configure, monitor and tune nets connected to the 3746-950 are also on the way, sources said.

Basics included

"Users will have to wait for the sexy stuff, but the basics are going to be there on Day One," said Lynn Nye, president of the NetResults consultancy in Portland, Ore. "It's as clear a migration path IBM has had for years."

IBM designed the 3746-900 as an expansion unit for the 3745, but its strategic purpose is to let SNA users migrate to APPN and TCP/IP simultaneously without tossing out the 3745.

Users that bought the 3746-900 expansion frame can unbolt the box and field upgrade to a stand-alone Model 950 for $5,000, sources said. New 3746-950s will cost in the neighborhood of $30,000, sources indicated.

IBM acknowledged the announcement was taking place but declined to add details. ■

HP

Continued from page 6

traffic problems and provide clients with faster data access.

"We're first in line for that 10/100 switch," he said. "Our students are accessing a lot of multimedia files, which puts a lot of congestion on the net."

HP will first introduce a two-port 100VG-AnyLAN module. Fiber Distributed Data Interface and Asynchronous Transfer Mode modules next year will follow.

The worldwide Ethernet switch market next year is expected to explode to about $3 billion in revenue — almost reaching the total 1994 revenue for the intelligent hub market of $3.5 billion — according to Dell'oro Group, a consultancy in Menlo Park, Calif.

When fully configured with 100VG-Any-LAN modules, the switch supports as many as 20 Ethernet segments. Also, the 10M/100M bit/sec switch supports 1,700 media access control addresses per port and can be managed by any Simple Network Management Protocol-based management platform.

In addition to the two slots for the high-speed modules, the switch will have an expansion slot for adding routing and remote access modules. HP also plans to add workgroup and backbone switches to the AdvanceStack family next year.

Most competitors — 3Com Corp., Bay Networks, Inc., Cisco and Plaintree Systems, Inc. — have already rolled out switching products, so HP is somewhat late to the party.

But Trudy Barker, principal analyst at Dataquest, Inc. in San Jose, Calif., said she thinks HP's timing to market is just right. "HP's model has always been to come in with the second wave of products in order to offer a better price point," she said.

The AdvanceStack 10/100 LAN Switch is available now for $6,495, or $405 per port. The two-port 100VG-AnyLAN module will ship in November and costs $2,195.

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IBM

Continued from page 1

agement Environment became irrelevant when OSF scrapped the object framework piece of DME. And the MIC alienated platform and application vendors alike with its disorganization and miscommunication.

But IBM seems to have put some momentum behind this attempt. Some possible participants are heavyweights: AT&T, Bay Networks, Inc., Bridgeway Corp., Cisco Systems, Inc., SunSoft, Inc., 3Com Corp., Tivoli Systems, Inc. and UB Networks, Inc.

Several vendors would not comment or were unavailable. "We have not been officially contacted by IBM, but when a major player puts forth an interoperability proposal for net management, we'd seriously look into it," said David Hayward, manager of public relations at 3Com.

David Abbajay, manager of network management at Cisco, said his company was not yet ready to endorse it. Abbajay suggested the initiative is IBM's response to "an acquisition about to happen in the network management area." He did not elaborate, but rumors were rampant last week that Microsoft was about to buy Network Managers.

Network Managers did not return phone calls. Microsoft declined comment.

IBM rival Hewlett-Packard Co. is not participating in this endeavor. In fact, HP OpenView program manager Gordon MacKinney said the company was unaware of the initiative.

What's on tap

The services being discussed are based on technology and standards from several sources. Some are already available in IBM's SystemView and NetView offerings; others will be made available in future products.

The agent instrumentation piece specifies adherence to the Desktop Management Task Force's Desktop Management Interface (DMI). It will include a software developers' kit for making Microsoft's Windows 95 and Windows NT DMI-compliant.

The platform interoperability piece will include application program interfaces (API) that let management consoles share event and topology data. This would allow platforms, such as OpenView or NetView for AIX, to cooperate in resolving faults.

The application portability piece will allow users of different management platforms to share applications. This schema is based on APIs from Network Managers, but that may change if Microsoft buys the company.

The data modeling component describes how to define the attributes of managed devices.

News of the industry initiative drew at least cautious praise from users. "Anytime you get vendors working on a common platform, the tools become much easier for customers to implement," said Kelly Holland, product specialist for network management at CompuServe, Inc. in Columbus, Ohio. ■

NetworkWorld

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Compaq

Continued from page 6

wind up with a server, hub, router and remote access product all in one box that would offer easy installation and management, said Ed Reynolds, Compaq's group product manager for internetworking.

Users were intrigued. "I'm interested in utilizing IOS for bandwidth reservation for video servers," said Robert Tharp, net architect at the Stanford University Health Clinic in Palo Alto, Calif. "Having the server understand that and participate in a networked system does tremendous things for your intranetwork bandwidth management."

For now, Compaq will focus first on developing its own standalone router based on Cisco's software. Compaq, which already manufactures its own modems and network adapters, is getting into the router business to be a one-stop shop for its users, Reynolds said.

The first Compaq product with integrated Cisco IOS is slated for the first half of 1996.

By bringing to market lower cost, integrated networking products, Compaq will not only open up new opportunities to serve small and midsize firms, but also could boost its visibility in Fortune 500 companies that have to support many remote sites, said Greg Cline, research director at Business Research Group, a Boston consultancy.

The new products will be targeted at corporate branch and remote offices, as well as small and midsize businesses, where ease of installation and management are important factors, Reynolds said.

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  Provides a significant new channel for IOS propagation
- **Users**
  Offers a range of scalable, manageable internetworking platforms from market leaders in servers and routers

He hedged when asked whether Compaq's Insight Manager server management application or its SmartStart application installation assistance tool would be revamped to support the new products.

However, Insight Manager would be ideal for integrated router management, Cline said. SmartStart could be expanded to make it easier for users to set up switching or routing systems integrated or linked with a Compaq server.

The Compaq-Cisco deal marks a trend to integrate networking components on servers, Cline said. Hewlett-Packard Co. and Digital Equipment Corp. both indicated that integrating a router onto a server is a logical next step. IBM declined to comment.

While there is not a product announcement on the horizon, Digital officials said the company is concentrating on integrating servers with devices that link them to mainframes and minicomputers.

HP, which already sells hubs with integrated router cards, is studying how the integration of routers and servers would go over with customers, said Maureen Mellon, worldwide product marketing manager for HP's NetServer personal computer servers.

"We've looked at [integrating routers into servers] in the past, and it's not clear whether a user is not better off buying a smaller, low-end router," she said.

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NorTel

Continued from page 6

product announcement found that most people are not happy to leave voice mail messages when they need to reach someone immediately (see graphic).

The harsh truth

The findings of Opinion Research Corp. of Princeton, N.J., are dramatically different from previous surveys regarding voice mail, and some industry experts were taken aback by the harshness of the results.

For example, the Voice Messaging Educational Committee, of which NorTel is a member, recently found that 94% of the companies it surveyed reported productivity gains after installing voice mail.

But NorTel officials pointed to users, such as hospitals and retailers, that cannot afford to be out of touch. For example, the New York-based retailer FAO Schwarz uses the Companion system for its personal shoppers so they can stay in touch with their clients while shopping in the store.

One version of the Companion system's telephone, designed for use with NorTel's flagship Meridian 1 PBX, emulates the features of Meridian's desk phone, including a display showing the name and phone number of the person calling.

Another version, dubbed the Companion C200, is a more generic unit designed to work with any PBX or key system, or in a Centrex environment.

For NorTel users with Meridian 1 PBXs, Options 11 through 81, installation of the Companion system does not require a software upgrade, Murashige said. But to use the calling line identification and calling party name feature on the portable phone, users must upgrade to the PBX's software Release 20 if they have not already done so, he added.

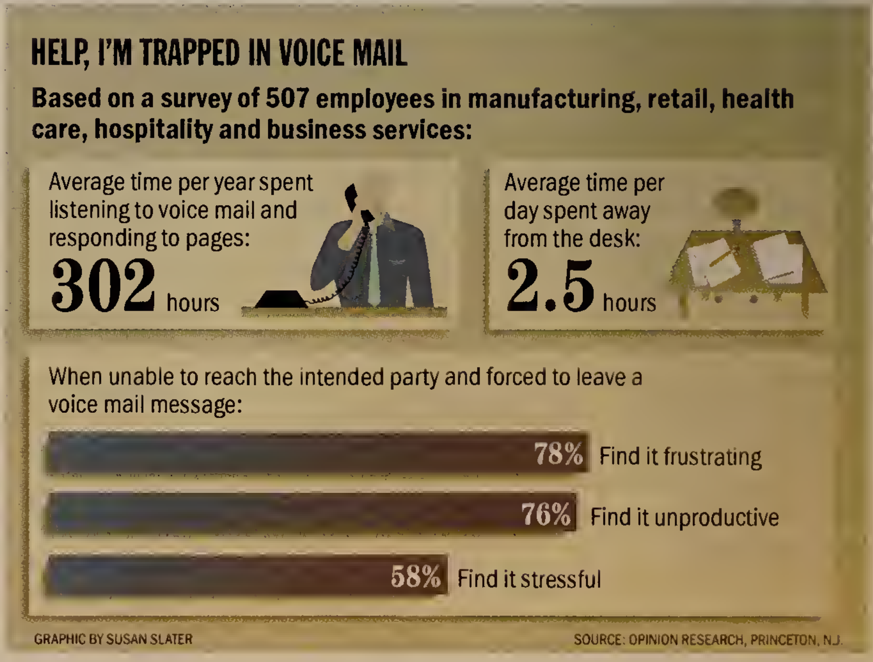
The Companion system is already in use in several countries but requires certification by an FCC-sponsored body administering PCS traffic before it can be released in the U.S. Such approval is expected by August, Murashige said. Early users such as FAO Schwarz are testing the system under an experimental license.

The list price for each wireless telephone is $550. The base stations cost about $1,500 each, with the number required depending on the number of mobile users in a facility and the distances involved.

©NorTel: (800) 667-8437.

HELP, I'M TRAPPED IN VOICE MAIL

Based on a survey of 507 employees in manufacturing, retail, health care, hospitality and business services:



GRAPHIC BY SUSAN SLATER

SOURCE: OPINION RESEARCH, PRINCETON, N.J.

Back to Reality

SNMP's gray hairs need fixing, not a dye job

I squinted to see past the bright light, my mouth stretched wide, struggling to enunciate intelligible answers to the dentist's questions as he probed teeth. I was depressed, but not from Dr. Dunson's inopportune third degree, or even his announcement of three new cavities.

"This guy's younger than me," I thought. "He's just a kid."

Trailing my recent 40th birthday, that painful experience made me feel truly over the hill.

David J. Buerger

If network management protocols were people, the Simple Network Management Protocol (SNMP to those in the know) would also be griping about aging and in need of some repair.

The SNMP story is one of those can-do marvels of the networking industry. As commercial networking took off in the late 1980s, people realized they needed a way to manage things before they got out of hand. Those were the days when some dreamers placed their faith in CMIP, the International Standards Organization's plan for network management.

CMIP was a dog. It was so bloated and unpleasant that I forgot what the acronym stood for and had to look it up. I bet you can't remember, either. (Send me your best guess and I'll publish the winner's name and answer.)

Four networking cowboys — Jeff Case, Keith McCloghrie, Marshall Rose and Steve Waldbusser — decided CMIP would never work and hatched the idea for a simpler protocol over burgers and fries at McDonald's. They wrote SNMP during a weekend, and it became the de facto standard for managing large networks.

Among the early uses for SNMP was John Romkey's scheme to manage a toaster through a network. Following Romkey's demo at the INTEROP 90 trade show, FTP Software built a crane out of Lego blocks that could deposit bread into the toaster.

The SNMP toaster crane product sold in droves because it was something every multinational corporation needed to feed hungry network managers who had stayed up all night fixing broken networks. It was Pavlovian: Fix the network, get breakfast.

The military was especially intrigued with this SNMP demo and used it to prototype antinuclear weapons management via wireless TCP/IP networks. The Ruskies were spoofed because they thought we were using ISO-based products.

But back to our story. SNMP is now mainstream networking. No more toasters or Lego blocks. It's serious stuff. Network managers are tired of being fed toast for breakfast. Now they want lunch and dinner, too.

The price of progress is — you guessed it — delays. "Progress" is defined as loads of new features that have to work with every brand of toaster, skillet, microwave oven and coffeepot.

SNMP's second revision, SNMPv2, has been under way for more than three years. It really should be called Complex Network Management Protocol. I guess they're having trouble integrating all that cooking gear.

"They," of course, are the same guys who wrote Version 1. But instead of whipping the revision out in another weekend, SNMP has become a big affair. Now there are gobs of Internet Engineering Task Force committees, an Internet Engineering Steering Group, an Internet Activities Board, an Internet Society and even *Time* magazine lording over their shoulders.

Life ain't so simple anymore.

Two of SNMP's creators — McCloghrie and Rose — recently proposed to drop Version 2's remote security configuration and public-key encryption components to make it less costly to implement. The other two creators oppose this move.

Observers are convinced this proposal will significantly delay SNMPv2's advance through the standards process. They're probably right. But why should this surprise or upset anyone?

Maybe I should strike that last comment. A faction within the standards-setting crowd is miffed at the thought of attending more boring committee meetings at such unpleasant locales as Paris, Tokyo, Fiji and the Virgin Islands. They just want to be done with the whole thing and move on to something new.

The alternative, which is to reject the McCloghrie-Rose proposal, means network managers will have to implement proprietary solutions for remote security configuration and encryption until SNMPv2 is finished.

But that's the best choice. By stripping the security components out now, as McCloghrie and Rose recommend, network managers will have to resort to proprietary solutions and the pain of later migration anyway. Might as well do the job right to achieve that omni-interoperable vision for SNMPv2, even if it takes longer.

"Floss those teeth," warned Dr. Dunson, "or we'll have to do a new version!"

Buerger is an Atlanta-based industry consultant. He can be reached at (404) 495-7494 or at dbuerger@pipeline.com.

CyberSpeak

Voices from the reader network

NEXT QUESTION

What, if any, steps should be taken to prevent the Internet from becoming an on-line red-light district?

Responses due by 8 p.m. Thursday, July 13. You'll get a T-shirt if we print your response. Please include your name, title, company and address.

How do you think the IBM/Lotus deal will affect Notes?

■ "Under IBM, Lotus Notes has the opportunity to move from a workgroup-oriented product to an enterprise-level collaborative application. With its expertise in computing, networking, systems integration and outsourcing, and its good relations with upper level MIS, IBM can help Notes evolve as an industrial client/server platform."
Annajeerao Nott, research associate, Georgia Institute of Technology, Atlanta

■ "I think it's a great deal for Notes. As long as IBM doesn't stifle the creativity at Lotus, we expect some strong new Notes applications for the OS/2 environment."
Steve Goodman, director of technology planning, Chicago Mercantile Exchange, Chicago

■ "If IBM brings the support [as in exceptional mainframe maintenance support] aspect of its business to Lotus through the merger, Notes will become a major player in its market. If IBM assumes the current customer base will be OK on its own or that little needs to be done to bolster Lotus' image or enhance support, Lotus Notes will fall by the wayside. Remember the Borland/WordPerfect merger and demise of Office Suite?"
Debi Henderson, systems engineer, Lockheed Martin, Upper Marlboro, Md.

■ "It will be an advantage for Notes because even more users will be exposed to it. It can now be more easily included in enterprise networking solutions."
Linda Mainord, president of Guide International Corp., a large IBM user group, Memphis, Tenn.

NEXT WEEK: Don't miss "Abend," our back-page column that alternates with "CyberSpeak" and brings you humorous items, oddities, marginalia and other insights from the Internet and elsewhere. Send items to network@world.std.com or get in touch with us any other way listed on page 29.

"OUR HIGH VALUE PRODUCTS DIVISION DEVELOPED AN INNOVATIVE, MOBILE PRODUCT TRACKING SYSTEM FOR SPECIALIZED, EXPENSIVE SHIPMENTS."

Ian Nicolson, Executive Vice President, HVP Division, North American Van Lines

IAN: "Our HVP (High Value Products) division deals with one-of-a-kind and high tech items. When these products are moving, we have to be able to tell our customers where they are at any moment."

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BUILT ON BTRIEVE

IAN: "With our mobile scanning system, we track everything in real time. Any overages or shortages are reported right away. If any routing errors do occur, we can correct them immediately."

BILL: "Shipping high value products requires utmost reliability. There's no room for error. There's no tolerance for delay. That kind of speed and reliability demands Btrieve."

To receive the complete story, call Btrieve Technologies, winner of the 1995 RealWare Award at DB/Expo.

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IT SIMPLY WORKS

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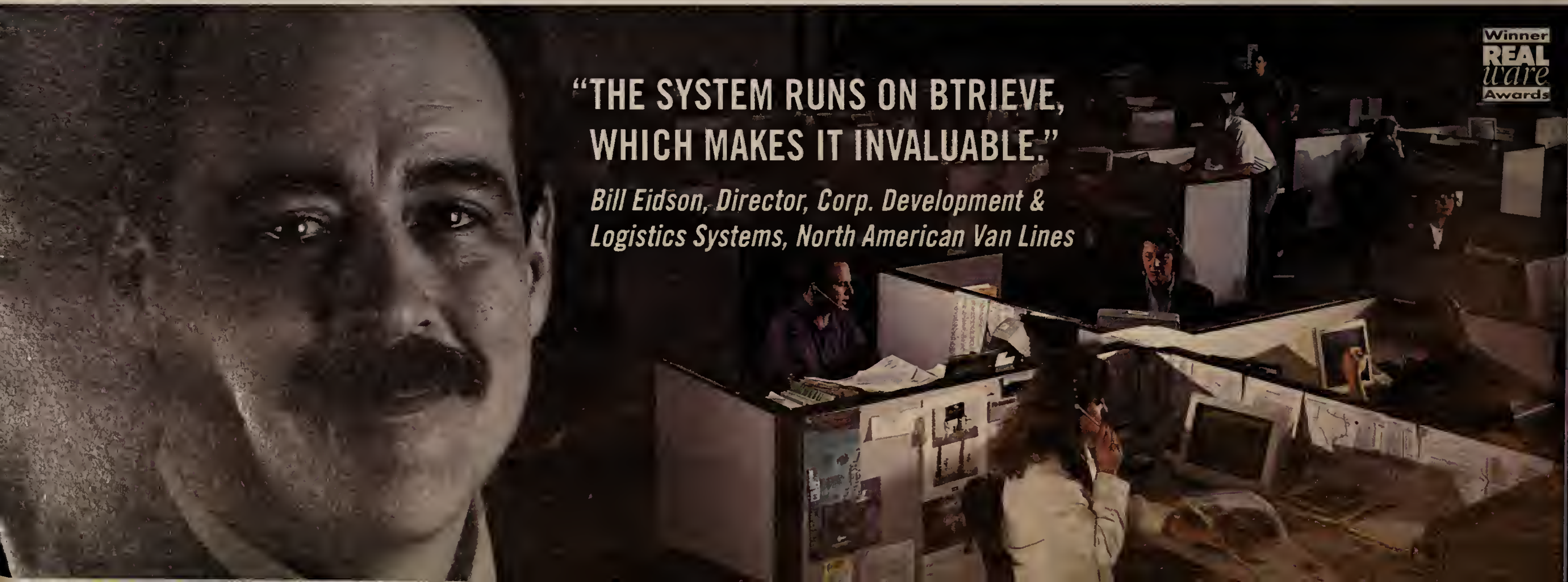

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Bill Eidson, Director, Corp. Development & Logistics Systems, North American Van Lines